United States
Department of
Agriculture

Agricultural
Research
Service

Beltsville Agricultural
Research Center

Beltsville, Maryland

National Potato Breeding Report, 1981

Fifty-second Annual Report by Cooperators

This progress report includes tentative results of research not sufficiently complete to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Therefore, this report is not intended for publication and should not be referred to in literature citations.

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Issued May 1982

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by
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DAN W. HALL
EXECUTIVE DIRECTOR

March 18, 1982

Dr. Raymond E. Webb, Chief
Vegetable Laboratory
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USDA Agr. Research Service
Northeastern Region
Beltsville, Maryland 20705

Dear Dr. Webb:

Congratulations on this publication of your 1981 National Potato Breeding Report. This, your 52nd annual report, provides significant information to libraries, researchers, producers and many others involved in the potato industry.

The National Potato Council, representing all the nation's some 14,000 potato producers, salutes you and the other cooperators who have compiled the information for this report. The practical application of the information provided by these yearly reports assist our nation's potato industry improve it's productivity. In an era of ever increasing production costs, these increases in productivity can make the difference between profitability or failure on our nation's potato farms.

Again, our congratulations to you and the others who have made this report possible.

Sincerely,

Dan W. Hall

Dan W. Hall, Executive Director
National Potato Council

DH:db

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UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC), BELTSVILLE, MARYLAND
AND CHAPMAN AND AROOSTOOK FARMS, PRESQUE ISLE, MAINE

Raymon E. Webb, Philip Baum, George W. L. Walter, and Robert W. Goth, BARC
and
David R. Wilson, Presque Isle, Maine

BARC

Breeding and Evaluation: Eighty-six selected clones and varieties possessing desirable economic characters were included in the breeding block. Resistance to viruses A, X, Y and leafroll, Verticillium wilt and the golden nematode, high solids contents and processing quality from extended low temperature storage were emphasized in the crossing plan. Five hundred sixty-two parental combinations were successful, and about 310,000 true seed were obtained. Twenty-two seed lines were planted for seedling tuber production, and about 15,000 tubers were harvested for distribution in 1982 (Table 1.) Twenty-two hundred seedlings segregating for resistance to virus Y were inoculated twice with the virus. Eleven hundred sixty-nine seedlings proved resistant, and tubers from them were harvested for field planting in 1982. Approximately 200 clones were screened for resistance to viruses X and Y. Eighty-nine clones resisting infection with race 1 of late blight following 9 weeks' exposure in the field were inoculated with races 1, 2, 3, 4 in the greenhouse. Eleven of these clones with the most promising economic characteristics were included in the 1982 breeding block. Baking trials on promising russet clones further substantiated the favorable qualities of clone B8972-1.

PRESQUE ISLE

Planting began May 11 and was completed June 4. Planting season was relatively favorable. A moderate drought prevailed during July and early August. Excessive rainfall again plagued the harvest (Table 4).

CHAPMAN FARM

Approximately 13,000 seedling tubers from 65 selected parental combinations were planted. Eleven hundred twelve clones were selected for 12-hill plantings in 1982. Promising selections from the 60- and 80-hill plantings were advanced to larger seed increases for interregional adaptability evaluations. Tables 2 and 3 indicate the clones and varieties furnished to various cooperators. Several clones, both round whites and russets, including B7805-1, B8833-6, B8934-4, B8943-4, and B8972-1, were on maximum seed increase and in grower trials.

AROOSTOOK FARM

Varietal collections and older breeding lines were grown for maintenance and distribution to cooperators. Yield and disease-resistance trials were done on Aroostook Farm and nearby Silver's Farm. Experimental design for all yield

trials was a randomized block with four replications of 25 seed pieces each. White tuber trials received 150 pounds NPK per acre, and russet types received 180 pounds NPK per acre banded with a two-row planter. Seed spacing for white tuber trials was 9 inches and for russet trials 12 inches. All plantings were done by hand.

Cultural methods and materials for weed, insect, and disease control were according to local recommendations. Rainfall and temperature during the season are given in Table 4. At harvest, all entries were graded and samples hand selected for specific gravity and quality evaluations. Specific gravity was determined by the air-water method. Following specific gravity determinations, selected samples were divided and placed at 50° F, 45° F, and 40° F storage at 90 percent relative humidity.

Samples stored at 50° F and 45° F were processed into chips after 2 months in storage. Samples stored at 40° F were divided into two groups: one group to be reconditioned at 70° F for 1 and 3 weeks prior to frying; and one group to be fried direct from 40° F after 4 months' storage if processing data from the 50° F stored group indicated potential low reducing sugar content buildup at that temperature. Russet samples were also processed into french fries.

Potato chips were made from each sample by cutting the russet tubers in half and taking a 1/16-inch-thick slice from each tuber with a rotary food slicer. Slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

A french fry plug, 3/8 inch in diameter, was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed, and excess water removed, they were fried at 365° F in Primex shortening for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made by using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classification as 1 = mealy, 2 = intermediate, or 3 = soggy, and a weighted texture index calculated.

SUMMARY

Drought conditions during July to early August reduced yields somewhat (Tables 5-8), and subsequent excessive moisture caused growth cracking in the more susceptible lines, both in the foundation seed plots and the later harvested yield trials. Little second growth (knobs, malformations) was noted in most russet lines. Specific gravities and processing qualities were slightly affected by the excessive moisture in late August and during the

harvest period. The early clone, B6969-2, was named the variety Oceania in 1981. The high solids, golden-nematode-resistant clone B6987-184 was released as the variety Chipbelle, in part, because of its high solids and excellent chipping quality. B7583-6, a late maturing, oblong russet clone with excellent baking quality, was named Russette. Golden-nematode resistant round white clones B7592-1 and B7805-1 and russet clones B8934-4 and B8943-4 are in advanced grower trials. Russet clone B8972-1 is in final seed increase phase prior to release as a variety.

Research beginning in 1977 and culminating in extensive processing trials during 1980 and 1981 indicates the potential for improving processing capability (Table 9) of multipest-resistant germplasm. Indicated clones are part of a group derived from a complex background involving Solanum tuberosum, demissum, chacoense, stoloniferum, andigenum, phureja, vernii, and others.

BARC Table 1. Distribution of first-year seedling tubers and true seed from BARC, 1980.

Location	Cooperator	Number Progeny	Number Seedling Tubers	Number True Seed
Domestic:				
California	M. A. Khan	2	-	600
Colorado	J. A. Twomey	74	12,300	-
Maine	D. R. Wilson	83	13,000	
	S. S. Leach	1		500
Minnesota	F. I. Lauer	57	10,400	-
Missouri	Tom Wagner	20	2,000	200
Nebraska	R. B. O'Keefe	27	3,500	-
North Carolina	F. L. Haynes, Jr.	95	15,100	300
Foreign:				
Taiwan	Min-Nan Chang	1	-	400

BARC Table 2. Distribution of varieties and clones to U.S. cooperators.

State	Cooperator	Varieties	Clones
Alabama	J. L. Turner	-	9
Arkansas	J. Stephens	1	-
California	R. Voss	1	-
	D. Kenfield	5	-
Florida	J. R. Shumaker	12	182
Georgia	C. A. Jaworski	112	19
Illinois	S. C. Trees	20	-
Indiana	R. R. Romanowski	1	-
Maryland	W. Youngman	2	-
Minnesota	S. Robishaw	1	-
Mississippi	B. Graves	9	77
Missouri	T. Wagner	8	25
Nebraska	E. Ball	1	1
New Jersey	M. Henninger	12	202
North Carolina	F. L. Haynes, Jr.	4	6
Ohio	F. Lower	1	-
	J. Homan	1	-
Oregon	A. R. Mosely	2	1
Pennsylvania	R. Zacharius	6	-
	E. Pell	13	-
	L. Kuhns	30	-
South Carolina	W. Sitterly	5	8
Virginia	C. Savage, Jr.	6	186
Wisconsin	M. Cipar	1	-

BARC Table 3. Distribution of varieties and clones to foreign cooperators.

Country	Cooperator	Number Varieties	Number Clones
Argentina	E. Brucher	9	-
Canada	L. Fuller	1	1
	N. S. Wright	1	2
	R. Stark	1	-
India	B. Nagaich	2	1
Indonesia	M. Marvel	11	-
Pakistan	M. Shah	-	8
South Africa	C. Wilkins	10	-
USSR	H. Korsakov	2	-
West Germany	L. Serdewitz	1	-

BARC Table 4. Weekly average maximum and minimum temperature and weekly rainfall, Aroostook Farm, Presque Isle, Maine.

Week Ending	Avg. Temperature F		Rainfall
	Min.	Max.	Inches
May 16	67	43	1.26
23	59	34	.48
30	74	54	1.37
June 6	75	48	.81
13	69	43	1.35
20	76	54	.23
27	69	48	2.44
July 4	83	55	-
11	82	56	.94
18	76	51	.19
25	77	52	.10
Aug. 1	77	51	.81
8	77	57	3.09
15	76	54	.49
22	76	50	3.11
29	74	46	.67
Sep. 5	76	51	-
12	68	46	.60
19	66	43	.96
26	56	41	1.57
Oct. 3	54	38	1.63
10	51	36	1.17
17	57	32	-
Total			20.27

BARC Table 5. Yield, tuber size, distribution, and quality characteristics clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1981.

Pedigree	Mkt Cwt	% Mkt	% Tuber Size Distribution <1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	3-1/4"- 4"	>4"	Tuber Rating[1]	Sp. Gv.[2]	50°F 2 mos. Color[3] Chip	FF	Tex[4]	45°F direct 4 mos. Color[3] Chip	FF	Tex[4]	40°F - 70°F 3 weeks Color[3] Chip	FF	Tex[4]
B6969-2	386	88	5	19	51	31	8	3	72	8.6	3.6	2.2	8.5	3.7	2.2	8.3	2.9	1.9
B6987-184	332	86	5	24	61	15	4	2	92	6.1	2.3	1.9	6.8	2.1	1.9	6.0	1.4	1.9
B7154-10	345	85	4	22	60	18	11	1	66	7.5	2.7	2.1	8.3	2.8	2.0	8.4	3.1	2.0
B7805-1	384	84	3	14	48	38	13	2	75	8.7	4.3	2.6	9.1	4.1	2.4	9.1	3.9	2.5
B8091-8	392	83	2	30	54	16	7	2	79	9.0	3.6	2.1	9.0	4.1	2.1	8.8	3.0	2.0
B8685-4	376	86	14	42	54	4	-	2	78	10.0	3.0	2.0	8.6	3.9	2.0	7.4	2.6	1.9
B8706-7	370	84	3	13	59	28	13	2	79	8.0	2.8	2.0	8.8	3.6	2.0	7.7	2.1	1.9
B8710-16	461	92	3	13	56	32	5	2+	81	8.3	2.9	2.1	8.7	3.9	2.0	8.3	3.1	2.0
B8751-6	395	92	5	18	67	15	1	2	71	8.1	3.2	2.0	8.7	3.4	2.0	9.2	3.4	2.0
B8887-1	304	83	15	38	51	10	3	1	82	6.3	2.2	2.1	7.4	2.4	1.9	6.4	1.7	2.0
B9018-12	365	89	10	32	60	9	1	1	74	7.7	2.4	2.0	8.0	2.3	1.9	7.4	2.2	1.8
B9127-6	398	88	2	10	61	30	10	2	74	8.6	3.3	2.2	9.1	4.0	2.2	8.4	2.8	2.1
B9130-24	356	81	19	66	32	2	-	2	80	8.1	3.1	2.1	8.8	3.7	2.2	8.2	3.3	2.0
B9140-4	362	89	11	50	47	3	-	4	81	7.7	2.4	2.0	7.9	3.3	2.0	8.0	2.3	2.0
B9140-6	328	92	3	11	67	22	5	2	79	7.9	2.8	2.0	8.6	3.3	2.0	7.2	2.5	1.8
Atlantic	416	88	6	19	59	22	6	2+	84	7.5	2.4	1.9	8.3	3.2	2.0	6.4	1.9	1.8
Belchip	432	89	5	21	62	17	5	2	83	6.8	2.1	4.0	7.2	2.0	1.7	6.9	1.8	1.9
Kennebec	327	76	4	12	46	42	20	2	74	7.6	2.9	4.0	8.4	3.3	2.0	7.2	2.4	2.0
LSD 5%	52								3									

[1] 1 = poor; 5 = outstanding
[2] 1.0 omitted.
[3] Chips: 1-7 = satisfactory; FF: 1-3 = satisfactory.
[4] FF & texture: 1-2 = satisfactory.

BARC Table 6. Yield, tuber size, distribution, and quality characteristics of clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1981.

Pedigree	Mkt Cwt	% Mkt	% Tuber Size Distribution <1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	3-1/4"- 4"	>4"	Tuber Rating[1]	Sp. Gv.[2]	50°F 2 mos. Color[3] Chip	FF	Tex[4]	45°F direct 4 mos. Color[3] Chip	FF	Tex[4]	40°F - 70°F 3 weeks Color[3] Chip	FF	Tex[4]
B9140-14	387	88	10	36	55	9	2	3	79	8.2	2.9	2.2	8.3	3.6	1.8	8.0	2.8	2.0
B9140-17	334	88	7	24	57	19	5	2	82	8.9	3.5	2.0	9.1	3.8	2.0	9.1	3.8	2.0
B9175-7	451	90	3	9	64	27	7	4	76	7.9	3.2	2.6	8.1	3.0	2.1	8.8	3.7	2.2
B9192-1	451	90	2	7	60	33	9	2	79	7.1	2.1	1.9	7.7	2.4	2.0	6.7	2.0	2.0
B9224-6	433	83	14	45	47	8	3	2	79	9.3	4.0	2.0	8.2	3.8	2.1	8.5	3.7	2.0
B9279-9	380	93	7	23	60	16	0	2	75	8.1	2.7	2.0	8.7	3.3	2.0	7.1	2.1	1.8
B9335-17	402	85	16	49	46	5	0	2	74	9.4	3.7	2.0	10.0	4.2	2.0	9.0	3.4	2.0
B9340-13	417	90	6	20	60	20	4	2	76	6.8	2.3	2.1	7.5	2.8	2.0	7.6	2.2	2.0
B9409-1	429	92	6	30	62	8	2	2	73	8.0	3.1	2.0	8.5	3.6	2.0	7.0	2.0	2.0
B9423-4	486	82	6	18	49	32	12	3	66	9.9	4.2	2.0	10.0	4.2	2.1	10.0	4.6	2.1
Dakchip	455	88	7	22	60	18	4	2	77	7.6	2.9	1.9	8.3	3.5	1.9	7.7	2.9	2.1
Norchip	414	90	7	36	53	11	3	3	85	7.4	2.6	2.0	8.0	3.1	2.0	7.0	2.1	1.7
Atlantic	444	90	7	18	61	22	3	3	87	7.9	2.4	2.0	8.4	3.4	2.0	6.5	1.9	1.8
Katahdin	338	80	3	13	55	32	17	2	74	8.7	3.4	2.2	9.1	4.2	2.0	8.6	3.6	2.0
LSD 5%	56								3									

1 2 3 4 - See footnotes Table 5.

BARC Table 7. Yield, tuber size, distribution, and quality characteristics of russet clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1981.

Pedigree	Mkt Cwt	% Mkt	% Tuber Size Distribution <1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	3-1/4"- 4"	>4"	Tuber Rating[1]	Sp. Gv.[2]	50°F 2 mos. Color[3] Chip	FF	Tex[4]	45°F direct 4 mos. Color[3] Chip	FF	Tex[4]	40°F - 70°F 3 weeks Color[3] Chip	FF	Tex[4]
B8686-8	272	81	8	25	61	14	11	2	85	5.9	2.0	1.8	6.5	2.0	2.0	6.0	2.0	1.7
B8833-6	313	84	14	57	40	3	1	2+	78	7.1	2.6	2.0	7.9	2.6	2.1	7.9	2.4	2.0
B8847-5	355	83	7	30	58	12	10	1	72	8.7	3.9	2.2	9.1	3.7	1.9	10.0	4.0	2.1
B8847-8	359	81	3	13	57	30	16	1	74	8.9	4.4	2.6	9.2	4.0	2.0	10.0	4.5	2.4
B8852-2	331	87	5	22	65	14	8	2	73	8.9	4.2	2.1	9.0	3.9	2.2	9.5	3.9	2.1
B8922-10	381	86	8	34	54	10	5	2	77	8.8	3.8	2.1	8.9	4.0	2.0	9.7	3.9	2.0
B8937-9	413	87	12	46	50	4	1	2	72	8.0	3.2	2.8	8.7	3.8	2.9	7.3	2.5	2.1
B8934-4	326	84	4	24	59	17	11	2	81	7.2	2.6	2.0	7.7	2.6	2.0	7.0	1.8	2.0
B8943-4	403	87	10	34	60	6	3	2+	79	8.0	3.2	2.1	8.6	3.5	2.0	7.4	2.1	1.8
B8972-1	389	89	7	29	61	10	4	3	80	7.1	2.2	2.2	7.6	2.9	2.1	7.9	2.7	2.0
B9137-9	401	86	5	20	68	12	10	2	80	7.3	2.4	2.1	8.0	2.6	2.0	7.5	2.1	1.9
B9208-4	330	88	7	29	59	12	6	2	78	7.6	2.9	2.2	8.1	2.5	2.0	7.9	2.4	2.0
BelRus	362	91	8	38	53	7	3	3	83	7.4	2.7	2.0	7.9	2.9	2.0	7.5	2.4	1.9
Russette	416	88	4	17	66	18	9	2+	85	8.9	3.2	2.0	9.1	3.8	2.0	8.5	2.9	1.9
Lemhi	310	66	6	18	62	21	28	2+	87	7.8	3.3	2.1	8.6	3.7	2.2	7.0	2.7	2.1
Allagash	312	83	4	19	62	19	14	2	69	6.3	2.2	2.2	7.2	2.0	2.0	6.1	1.5	2.0
Centennial Russet	391	85	5	20	62	18	7	2	80	9.1	3.9	2.3	9.5	4.1	2.3	10.0	4.6	2.1
Burbank	450	83	12	45	42	13	5	1	77	8.0	4.0	2.0	8.6	4.1	2.0	8.2	3.5	1.9
LSD 5%	56								4									

1 2 3 4 - See footnotes Table 5.

BARC Table 8. Yield, tuber size, distribution, and quality characteristics of russet clones harvested 120 days after planting (late maturity) on Aroostook Farm, 1981.

Pedigree	Mkt Cwt	% Mkt	% Tuber Size Distribution <1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	3-1/4"- 4"	>4"	Tuber Rating[1]	Sp. Gv.[2]	50°F 2 mos. Color[3] Chip	FF	Tex	45°F direct 4 mos. Color[3] Chip	FF	Tex	40°F - 70°F 3 weeks Color[3] Chip	FF	Tex
B9217-7	407	93	3	17	69	14	3	3	78	7.3	2.8	2.0	8.0	3.2	2.0	7.0	2.4	2.0
B9219-2	355	94	5	27	59	14	1	3	76	7.6	2.8	2.2	7.9	3.2	2.0	8.7	3.4	2.0
B9395-25	353	90	4	20	59	21	7	2	82	7.6	2.5	2.3	8.1	3.3	2.2	7.3	2.2	2.0
B9398-2	290	71	7	25	56	19	22	2	86	6.4	2.0	2.0	7.2	2.6	2.0	6.7	2.0	2.0
B9399-1	335	91	8	35	53	13	1	2	73	7.8	3.3	2.1	8.2	3.1	2.1	7.2	2.5	2.0
B9399-19	341	83	14	48	46	6	2	3	73	7.3	2.6	2.1	8.1	3.3	2.0	8.5	3.3	1.9
B9418-7	274	81	7	43	50	7	0	4	82	6.1	1.5	2.0	6.3	2.0	1.9	5.0	1.8	1.9
B9419-3	278	69	7	21	49	26	24	3	78	6.0	2.1	2.2	7.5	2.6	1.9	6.3	1.6	2.0
B9419-6	382	90	7	37	55	7	2	3	70	7.2	2.2	2.4	8.3	2.8	2.0	6.0	1.7	2.0
Highlat	334	80	4	33	47	20	16	2	74	8.1	3.0	2.1	8.7	3.6	2.0	8.9	3.4	2.0
Lemhi	317	59	4	18	50	32	36	3	84	8.7	3.4	2.3	8.6	3.7	2.2	7.4	2.6	2.1
BelRus	344	91	8	52	45	4	2	3	82	6.9	2.3	2.0	7.4	2.5	2.0	7.0	1.9	2.6
Russette	413	89	2	16	70	14	8	3	84	6.2	3.0	2.0	8.8	3.8	2.0	8.5	3.2	2.0
Russet Burbank	414	85	10	42	51	7	6	1	81	8.1	3.8	2.1	8.3	3.6	2.0	7.9	3.1	1.9
LSD 5%	57							4										

1 2 3 4 - See footnote Table 5

BARC Table 9. Selected clones showing promise for processing into acceptable chips direct from 4-month storage at 40° F.

Clone/ Variety	Yield CWT/A No. 1s	Tuber Rating[1]	Specific Gravity[2]		Chip Color[3]	
			1980	1981	1980	1981
B9507-14	525	2	86	90	6.2	7.0
B9515-2	316	1	81	75	6.2	6.0
B9516-2	425	4	93	93	6.4	6.8
B9516-6	347	2	82	81	7.0	6.0
B9516-8	358	2	94	88	6.0	5.0
B9518-1	254	3	82	85	7.0	6.8
B9518-3	406	4	90	92	5.6	6.0
B9528-9	421	2	103	98	6.8	7.0
B9530-13	404	1	84	96	6.0	7.0
B9547-28	450	5	80	83	6.4	6.4
Monona	364	2	68	64	8.2	8.4
Norchip	480	2	86	83	8.6	9.2
Belchip	466	2	86	82	8.4	9.0

[1] [2] [3] - See footnote Table 5

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

R. W. Ross and R. E. Hanneman, Jr.

Introduction of New Stocks. One hundred sixty-one accessions were added to the collection. One hundred twenty were true seed introductions of Argentine, Bolivian, Mexican and Peruvian species provided by Solanum taxonomists, J. G. Hawkes or C. M. Ochoa, following recent collecting expeditions.

Preservation and Increase of Stocks. Approximately 90 percent of the introductions contained in the collection are maintained as true seed. Satisfactory seed increases of 173 species introductions and intraspecific hybrids were obtained under glass, fiberglass, or screen. Recently-harvested seed samples of 161 species introductions were packaged for storage in the National Seed Storage Laboratory. Germination percentages of 750 seed lots of 2-20 years of age were determined.

Thirty-two introductions have been placed into meristem culture, 23 of which were heat treated. Eight potato virus S (PVS) and potato virus X (PVX) free lines were found bringing the total number of meristem derived virus free lines to 19. Seventy introductions have been tested serologically for PVS and PVX using the latex agglutination technique. One thousand and forty-six foreign cultivars, species and genetic stocks were tested for potato spindle tuber viroid (PSTV) using polyacrylamide gel electrophoresis, and 146 (14 percent) were found to be infected and have been discarded. Two improved meristem culture media have been developed--one for storage and the other for shoot tip regeneration.

Classification. Solanum taxonomist K. A. Okada spent three weeks examining the seedling progenies of numerous Argentine species collections he provided earlier for authentication of provisional or questionable site classifications. With assistance, 650-700 herbarium speciments were prepared for further study and inclusion in the INTA Balcarce Collection herbarium.

Herbarium speciments of nearly 50 representative Argentine species collections were added to the herbarium here. More than 4,000 herbarium mounts representing specific and interspecific variability of 99 species are now available for taxonomic use.

Distribution of Stocks. Seed and tuber shipments were sent to potato workers in 19 states within this country and to those in 14 other countries. Shipments included 2,263 seed and 1,899 tuber samples of species introductions, and 284 tuber samples of germplasm developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project, involving species introductions.

Copies of a listing of 232 species introductions available in the form of tuber families (particularly for the benefit of potato projects without adequate greenhouse facilities) were distributed to more than 200 potato workers. This mailing elicited 23 responses that depleted most of the tuber families offered.

Evaluation of Stocks. The more recent accessions are being steadily evaluated for characters of economic importance thorugh the cooperative efforts of state, federal, and foreign laboratories.

Usefulness of Findings. The major objective of the Inter-Regional Potato Introduction Project is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germplasm and for ways to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Six new potato varieties, Alasclear, Highlat Russet, Lemhi Russet, Pennrose, Rosa and Rhinered, were released for commercial production in 1980-1981. The number of foreign introductions entering into their pedigrees are six, eleven, seven, twelve, ten and seven, respectively. One hundred fifty-two of the 156 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigrees. These varieties presently comprise about 65 percent of the annual seed potato production in the United States.

Basic research programs conducted in several states and other countries continue to provide information concerning the potential value and diversity of the Solanum species, and consequently the knowledge necessary for more effective utilization of the IR-1 germplasm collection. During 1981, 38 papers, 30 abstracts, and 17 theses reported the use of Solanum introductions.

NORTH CENTRAL REGIONAL POTATO TRIALS - 1981

R. H. Johansen and Cooperators[1/]

Potato Cultivar Trials

The year 1981 was the 31st year that the North Central Trials have been conducted. The trials are now conducted in 14 states and two provinces in Canada, and with the exception of Colorado, all locations reported data for the 1981 trial. The Colorado trial has been lost due to a heavy infestation of psyllids.

Recent Potato Cultivars

Progeny Number	Released	Released by	Release Name	Parentage
W729R	1980	Wisconsin	Rhinered	W639 X Norchief

Cooperating States and Provinces

State or Province	Date Planted	Date Harvested	Total Days to Harvest
Alberta	5/13	9/21	132
Manitoba	5/11	9/14	127
Indiana	5/28	10/19	135
Iowa	5/1	8/21	112
Kansas	3/24	7/24	122
Kentucky	4/6	9/14	164
Louisiana	2/24	6/3	100
Michigan	5/7	9/29	146
Minnesota	5/21	8/28	114
Missouri	3/18	8/6	143
Nebraska	5/25	9/17	116
North Dakota	5/13	9/21	132
Ohio	5/8	9/10	126
South Dakota	4/30	9/17	141
Wisconsin	4/30	9/22	146

Soil Type. Soil type ranged from clay loam to sand. The Indiana trial was grown on organic soil on muck land.

1/ Indiana, H. Erickson; Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, R. Chase; Minnesota, F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. Johansen; Ohio, J. Pisarczyk; South Dakota, P. Prashar; Wisconsin, D. Kichefski, S. Peloquin & J. Schoenemann; USDA - R. Webb; Alaska, C. Dearborn; Alberta, S. Molnar; Manitoba, W. Russell; USDA - Idaho, J. Pavek; Iowa, W. Summers; Colorado, C.Urano; Kentucky, J. Snyder.

Cultural Practices and Chemicals Used. Fertilizers, fungicides, insecticides, vine killers, and herbicides used were based on local conditions. The following insecticides were used: Supracide, 25E, Thiodan, Ambush, Diazinon, Sevin, Monitor, Guthion, Mancozeb, Thimet, Pydrin and Phosphamidon. Fungicides used were: Difolatan, Diathane, M22, M45 and M-200. Herbicides used were Eptam, Sencor, Ambush, Treflan, Lasso, Lorox; and vine killers used were Reglone, Dinoseb, Dinitro. Mechanical means were also used as vine killers. Fertilizers ranged from 100 pounds to 1500 pounds per acre and the analysis varied from location to location. Spacing was generally one foot between hills and 36 inches between rows.

Weather and Growing Conditions. During 1981 the growing season was again early in the northern states and the two Canadian provinces. For this part of the country the season was generally dry during the winter and spring and quite wet during July and August. In Indiana, heavy rains shortly after planting caused local flooding and stressed the young plants. The total precipitation in Indiana was 21 inches for the growing season and the temperature was slightly above normal each month. In Kansas, the rainfall was above average and the temperature below normal. Louisiana had ideal moisture and temperature for the entire growing season. Kentucky rainfall was below average and the temperature was above normal. Missouri had excessive rainfall during the tuberization period.

Entries. Entries were received from Nebraska, Minnesota, Wisconsin, Louisiana and North Dakota. The check cultivars were Norchip, Norland, Red Pontiac and Russet Burbank. Louisiana did not report any data for Wisc. 726 and Wisc. 774R. Nebraska and South Dakota did not report yield, etc. for Wisc. 774R, however they did report maturity. Apparently in South Dakota very few seed pieces of Wisc. 774R germinated.

Total and U.S. No. 1 Yield. Red Pontiac was again the highest yielding entry for both Total and U.S. No. 1 yield. Red Pontiac has been a check cultivar in the North Central Regional Potato Trials since the trial was initiated in 1950 and with the exception of one or two years, it has consistently been the top yielding entry. Other high yielding entries in 1981 were Neb. 219.73-3 , Minn. 8777 and Wisc. 774R.

Kentucky and Wisconsin reported the highest yields and Iowa reported the lowest yields. Total and U.S. No. 1 yields are found in North Central Regional Tables 1 and 2.

Percent U.S. No. 1. Iowa, Kansas, Louisiana and Nebraska reported the lowest percent U.S. No. 1 and Missouri and Minnesota produced the highest percent U.S. No. 1. Russet Burbank and Minn. 9781 produced the lowest percent U.S. No. 1 (North Central Regional Table 3).

Maturity

Norland and ND146-4R were the earliest maturing entries in trial. The latest maturing entries were Neb. A129.69-1 and Russet Burbank. Comparable to Norchip in maturity were Minn. 9781, Neb. 7.67-1, ND119-3 and ND55-7. Maturity is found in North Central Regional Table 4.

Percent Total Solids. Percent total solids are found in North Central Regional Table 5. The highest total solids entries were Minn. 10162, Minn. 9781 and Norchip. Other high solid entries were Russet Burbank and Wisc. 726. Norland and Red Pontiac produced the lowest percent total solids. Highest total solids were reported by Alberta, Manitoba and North Dakota.

Scab Reaction. Minnesota and Kansas reported the highest incidence of scab. Scab reactions are found in North Central Regional Table 6.

Summary of Grade Defects. A high incidence of scab and growth cracks was found in Neb. A219.70-3. Russet Burbank again had serious second growth. Certain advanced breedling lines are starred (*) to point out certain external and internal grade defects (North Central Regional Table 7).

Chip Quality. Along with Norchip, lines ND146-4R, Minn. 10162, Wisc. 726 and ND55-7 appeared to have the best chip quality. Agtron and PCII color chart readings are found in North Central Regional Table 8.

Early Blight Readings. Early blight readings are found in North Central Regional Table 9. It appears that the late maturing entries had the most early blight resistance.

Overall Merit Ratings. Merit ratings[1/] are presented for 1979, 1980 and 1981. In 1981, Neb. A129.69-1 received the highest merit rating followed by ND146-4R. In 1979 these two selections were reversed as ND146-4R was first and Neb. A129.69-1 was second. For all three years, Wisc. 726 has been rated in the top five.

Cultivar or Selection	1979	1980	1981
Neb. 129.69-1		25	35
ND146-4R	24	28	32
Minn. 8777			29
Wisc. 726	29	23	29
ND55-7			19

1/ MERIT RATINGS

Rating	Points
1	5
2	4
3	3
4	2
5	1

North Central Regional Table 1. Total Yield (Cwt/Acre) - 1981.

Cultivar or Selection	Alb.	Manit.	Ind.	Iowa	Kansas	Kent.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Average
Early to Medium Early																
ND146-4R	325	233	299	140	98	355	197	347	259	297	190	253	284	156	437	258.0
Norland	266	208	284	146	119	305	141	334	263	191	231	205	298	212	443	243.1
Medium to Late																
Neb. A129.69-1	341	237	396	95	190	502	185	322	264	267	246	236	351	312	554	299.9
Neb. A219.70-3	444	313	441	136	230	605	238	584	330	196	336	333	413	218	541	357.2
Neb. 7.67-1	451	235	311	110	169	326	149	273	273	224	243	245	337	285	515	276.4
Minn. 9781	287	164	165	71	129	446	149	230	266	148	98	219	245	247	452	221.1
Minn. 8777	329	304	410	122	212	636	195	545	360	250	226	260	472	185	724	348.7
Minn. 10162	333	233	276	112	167	552	179	193	240	143	194	256	346	203	430	257.1
Wisc. 726	317	257	301	98	175	463	--	306	352	197	258	241	366	241	506	291.3
Wisc. 774R	310	230	318	151	180	454	--	458	350	163	--	221	257	--	561	304.4
La. 7196	157	229	290	142	173	652	183	372	321	216	214	203	317	142	613	281.6
La. 31-124	223	164	242	122	155	453	235	364	275	189	95	250	333	165	510	251.7
ND119-3	321	167	268	74	98	243	132	229	232	154	163	225	253	231	361	210.1
ND55-7	231	269	224	107	143	344	217	283	343	233	285	317	340	298	437	271.4
Red Pontiac	557	295	447	162	231	481	231	650	458	354	268	298	432	350	770	398.9
Russet Burbank	432	249	238	126	177	714	154	411	387	227	210	239	385	240	604	319.5
Norchip	342	246	270	126	153	496	246	382	325	286	289	262	330	243	448	296.3
Average	333	237	305	120	165	472	189	370	312	220	222	251	339	233	524	287.5

North Central Regional Table 2. U.S. No. Yield (Cwt/Acre) - 1981.

Cultivar or Selection	Alb.	Manit.	Ind.	Iowa	Kansas	Kent.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Average
Early to Medium Early																
ND146-4R	271	204	238	68	61	302	130	286	219	289	120	233	247	136	339	209.5
Norland	228	192	231	111	74	276	76	300	244	188	172	178	265	191	392	207.9
Medium to Late																
Neb. A129.69-1	275	213	358	44	147	437	150	292	234	264	184	298	319	254	499	257.9
Neb. A219.70-3	280	248	424	92	168	551	125	579	319	193	200	296	359	207	514	303.7
Neb. 7.67-1	375	207	266	45	124	290	43	236	253	220	174	217	286	260	476	232.1
Minn. 9781	145	115	126	13	23	388	76	123	239	144	54	130	98	196	374	149.6
Minn. 8777	258	285	357	63	167	560	106	524	346	245	164	233	430	163	666	304.5
Minn. 10162	212	187	239	35	85	502	109	152	223	140	79	226	263	180	378	200.7
Wisc. 726	195	225	264	60	138	421	--	291	339	194	167	162	307	223	476	247.3
Wisc. 774R	223	201	287	70	112	381	--	413	322	156	--	186	221	--	472	253.7
La. 7196	99	207	261	60	91	554	119	327	297	205	163	183	235	114	568	232.2
La. 31-124	106	133	216	74	80	394	165	336	261	184	56	213	266	147	457	205.9
ND119-3	236	131	214	39	51	207	63	188	204	151	103	195	200	205	303	166.0
ND55-7	175	184	161	59	69	285	143	222	295	228	222	273	282	252	336	212.4
Red Pontiac	344	260	402	85	199	404	131	599	440	351	197	255	371	314	715	337.8
Russet Burbank	192	184	202	35	65	678	38	300	354	223	64	131	204	183	519	224.8
Norchip	209	215	222	69	109	391	144	332	303	282	206	204	234	225	434	238.6
Average	225	200	263	60	104	413	108	324	288	215	145	207	270	203	466	234.4

North Central Regional Table 3. Average Percent U.S. No. 1 over 2" Diameter - 1981.

Cultivar or Selection	Alb.	Manit.	Ind.	Iowa	Kansas	Kent.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Average
Early to Medium Early																
ND146-4R	83	88	80	47	62	85	66	82	85	97	63	92	87	87	78	78.8
Norland	86	92	81	76	62	91	54	90	94	98	75	87	89	90	88	83.5
Medium to Late																
Neb. A129.69-1	80	90	90	43	77	87	71	91	89	99	75	84	91	81	90	83.2
Neb. A219.70-3	63	79	96	66	73	91	53	99	97	59	99	89	87	95	95	82.7
Neb. 7.67-1	83	88	85	42	73	89	29	86	97	98	71	89	85	91	92	79.9
Minn. 9781	50	70	76	20	18	87	51	53	90	97	55	59	40	79	83	61.9
Minn. 8777	78	94	87	50	79	88	54	96	96	98	73	90	91	88	92	83.6
Minn. 10162	63	80	87	30	51	91	61	79	93	98	41	88	76	88	88	74.3
Wisc. 726	61	88	88	61	79	91	--	95	96	99	65	67	84	92	94	82.9
Wisc. 774R	72	87	90	48	62	84	--	90	92	96	--	84	86	--	84	81.3
La. 7196	63	90	90	44	53	85	65	88	93	95	76	90	74	81	93	78.7
La. 31-124	47	81	89	60	52	87	70	91	95	97	59	85	80	89	90	78.1
ND119-3	74	78	80	52	52	85	48	82	88	98	63	87	79	89	84	75.9
ND55-7	76	68	72	55	48	83	66	78	86	98	78	86	83	85	77	75.9
Red Pontiac	62	88	90	52	86	84	57	92	96	99	74	86	86	90	93	82.3
Russet Burbank	44	74	85	23	37	95	25	73	92	98	30	55	53	76	86	63.1
Norchip	61	88	82	55	71	79	59	87	93	99	71	78	71	92	97	78.9
Average	67	84	85	49	61	87	56	85	92	98	64	82	79	87	88	77.9

North Central Regional Table 4. Maturity Classification[1/] - 1981.

Cultivar or Selection	Alb.	Manit.	Ind.	Iowa	Kansas	Kent.	La.	Mich.	Minn.[2/]	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Average
Early to Medium Early																
ND146-4R	2.5	1.9	2.5	1.0	2.0	1.0	2.0	2.0		2.0	1.0	2.9	1.0	1.0	1.0	1.7
Norland	1.5	1.5	2.2	1.0	2.5	1.0	1.0	2.0		1.5	1.0	2.1	1.0	1.0	1.0	1.5
Medium to Late																
Neb. A129.69-1	3.0	3.9	5.0	5.0	3.8	5.0	3.0	4.0		4.0	3.0	4.9	5.0	5.0	5.0	4.3
Neb. A219.70-3	3.0	3.4	4.2	3.0	3.8	4.0	3.0	3.0		4.0	3.0	5.0	5.0	5.0	5.0	3.9
Neb. 7.67-1	1.5	2.0	3.0	2.0	4.3	4.0	3.0	3.0		4.0	1.0	3.0	2.0	2.0	2.0	2.6
Minn. 9781	2.0	3.3	3.8	1.0	3.5	4.0	3.0	2.5		3.5	2.0	3.6	3.0	2.0	3.0	2.9
Minn. 8777	3.5	4.4	4.8	2.0	4.3	4.0	3.0	3.5		4.0	2.0	4.5	5.0	3.0	4.0	3.8
Minn. 10162	3.5	3.0	4.5	3.0	3.0	4.0	3.0	3.0		3.0	3.0	4.0	3.0	4.0	4.0	3.4
Wisc. 726	2.5	3.3	3.5	2.0	3.8	4.0	--	3.5		4.0	4.0	3.5	2.0	3.0	4.0	3.3
Wisc. 774R	3.5	3.1	4.2	1.0	2.8	3.0	--	3.5		3.0	1.0	4.1	4.0	3.5	3.0	3.1
La. 7196	2.5	3.8	4.8	1.0	4.0	4.0	5.0	3.0		4.0	3.0	5.0	4.0	3.0	5.0	3.7
La. 31-124	2.5	3.1	4.0	3.0	3.5	3.0	4.0	3.5		3.5	3.0	3.8	2.0	2.5	3.0	3.2
ND119-3	2.5	1.4	3.0	1.0	3.5	3.0	3.0	2.5		3.5	1.0	2.9	1.0	2.0	3.0	2.4
ND55-7	2.0	2.3	2.8	1.0	3.8	4.0	3.0	3.5		3.5	1.0	3.3	2.0	2.0	3.0	2.7
Red Pontiac	3.5	2.4	4.8	2.0	4.0	4.0	4.0	4.5		4.0	3.0	4.4	3.0	3.0	5.0	3.7
Russet Burbank	4.5	3.5	4.5	4.0	3.0	5.0	5.0	4.5		3.5	2.0	4.9	5.0	4.0	4.0	4.1
Norchip	1.5	2.6	3.8	1.0	3.0	4.0	3.0	3.0		3.5	2.0	3.1	3.0	3.0	3.0	2.8
Average	2.7	2.9	3.9	2.0	3.5	3.8	3.2	3.2		3.4	2.1	3.8	3.0	2.9	3.4	3.1

1/ 1. Very Early - Norland Maturity
2. Early - Irish Cobbler Maturity
3. Medium - Red Pontiac Maturity
4. Late - Katahdin Maturity
5. Very Late- Russet Burbank Maturity

2/ No data reported.

North Central Regional Table 5. Percent Total Solids - 1981.

Cultivar	Alb.	Manit.	Ind.	Iowa	Kansas	Ken.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Ave.
Early to Medium Early																
ND146-4R	20.3	19.7	15.0	13.1	19.0	14.5	16.0	17.1	16.2	16.5	18.0	20.2	18.6	16.5	15.4	17.1
Norland	18.2	18.6	13.4	13.1	17.6	13.2	15.0	15.4	16.9	15.4	15.9	19.4	17.3	15.9	15.0	16.0
Medium to Late																
Neb. A129.69-1	27.0	21.6	15.2	17.3	18.1	16.2	15.0	18.2	19.0	15.0	19.9	19.5	17.1	19.5	17.3	18.4
Neb. A219.70-3	21.5	19.7	13.6	16.0	17.2	14.3	16.5	17.7	18.4	14.3	19.4	18.7	18.0	18.9	16.5	17.4
Neb. 7.67-1	19.8	18.8	14.0	13.1	16.6	12.4	15.0	16.2	15.8	15.4	17.7	22.5	18.2	16.0	15.0	16.4
Minn. 9781	24.5	22.3	17.4	--	17.9	17.0	16.9	18.4	20.5	17.3	19.4	23.0	21.8	16.6	20.1	19.5
Minn. 8777	23.0	20.1	15.6	13.9	16.4	16.8	16.0	18.4	17.5	14.3	18.0	19.9	18.6	15.7	17.3	17.4
Minn. 10162	24.5	23.8	18.7	14.8	20.2	18.5	19.2	18.4	20.5	15.8	21.7	23.2	20.7	21.2	20.1	20.1
Wisc. 726	21.8	22.6	17.8	15.8	19.4	15.5	--	18.2	19.0	15.8	20.2	20.5	20.5	18.1	20.1	19.0
Wisc. 774R	23.8	19.6	15.0	13.3	16.3	13.4	--	16.9	16.2	14.3	--	18.9	16.7	--	16.7	16.8
La. 7196	20.8	18.3	15.2	15.0	17.4	14.3	17.7	18.2	16.7	14.3	18.3	18.5	17.7	21.1	15.4	17.3
La. 31-124	21.0	19.0	16.5	14.1	16.8	13.0	16.5	17.1	16.5	14.3	20.5	19.6	19.4	17.5	15.4	17.1
ND119-3	23.8	17.7	15.2	14.5	18.9	13.8	15.0	16.2	16.0	15.2	17.3	19.4	18.6	16.2	15.0	16.9
ND55-7	21.5	21.5	16.0	13.5	18.7	15.1	15.6	18.0	17.8	15.2	20.4	22.0	20.1	17.7	18.0	18.1
Red Pontiac	20.3	19.4	14.3	12.9	16.1	12.8	15.0	17.1	15.6	14.8	18.4	18.2	18.2	15.5	16.7	16.4
Russet Burbank	20.3	22.6	16.9	14.5	17.9	17.4	16.9	19.2	20.1	16.5	20.5	21.4	19.9	19.9	20.1	18.9
Norchip	23.8	22.3	16.0	15.6	19.2	17.6	17.7	19.2	18.4	17.1	20.9	22.3	21.4	18.6	19.7	19.3
Average	22.1	20.5	15.6	14.4	17.9	15.1	16.3	17.6	17.7	15.4	19.2	20.4	19.0	17.8	17.3	17.8

North Central Regional Table 6. Scab Reaction Report. Most Representative Scab (Area-Type)[1/] - 1981.

Cultivar	Alb.	Manit.	Ind.	Iowa	Kansas	Ken.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.
Early to Medium Early															
ND146-4R		1-2	3-2	T-1	1-1	T-1	0-0		5-2	0-0	1-3	T-1		1-1	
Norland	T-1	1-2	1-3	T-1	1-1	T-1	T-1		5-3	0-0	1-3	T-1	T-1		
Medium to Late															
Neb.A129.69-1	1-3	1-2		T-3	2-1	1-2	T-1		5-4	1-3	1-3	2-3			1-1
Neb.A219.70-3		1-2	2-3	T-1	2-1	1-4	T-1		5-3	T-1	1-3	2-3	1-2		2-1
Neb. 7.67-1	T-1			T-1	1-1	T-2	T-1		2-2	0-0	1-2	T-1			
Minn. 9781		1-2	2-3	T-1	3-1	1-2	T-1		4-2	T-4	1-2	0-0			
Minn. 8777		1-1	1-4	T-3	3-2	T-1	T-1		4-5	0-0	1-3	1-1		4-1	
Minn. 10162	T-2	T-2		T-1	2-1	T-1	T-1	1-3	5-4	0-0	0-0	1-2	T-4		1-3
Wisc. 726	1-2	T-1		T-1	2-1	T-1			5-3	T-3	1-4	2-2			
Wisc. 774R		1-1	3-1	T-1	1-1	T-1			5-4	0-0		T-1			
La. 7196	T-1	2-2		T-1	3-1	1-3	0-0		5-3	T-3	1-3	2-2			1-4
La. 31-124	T-1	T-2		T-1	1-1	T-1	T-1		5-5	1-4	1-2	2-2	T-3		
ND119-3	T-1			T-1	1-1	T-1	T-1		5-2	T-1	1-2	T-1			
ND55-7		1-1		T-1	2-1	T-1	T-1		4-4	0-0	1-1	T-1			
Red Pontiac		1-2	3-2	T-1	3-2	T-1	0-0		5-5	0-0	1-3	1-2	1-2		
Russet Burbank	T-1			T-1	2-1	T-1	9-9		3-2	0-0	0-0	T-1			
Norchip		T-1	1-2	T-1	2-1	T-1	1-1		2-3	0-0	1-2	T-1			

1/ AREA
T = less than 1%
1 = 1-20%
2 = 21-40%
3 = 41-60%
4 = 61-80%
5 = 81-100%

TYPE
1 - Small, superficial
2 - Larger, superficial
3 - Larger, rough pustules
4 - Larger pustules, shallow holes
5 - Very large pustules, deep holes

North Central Regional Table 7. Summary of Grade Defects - 1980.

Cultivar	External					Internal			
	Scab	Growth Cracks	Second Growth	Sun Green	Total Free of[1] Ext. Defects	Hollow Heart	Internal Necrosis	Vascular Discoloration	Total Free of[1] Int. Defects
Early to Medium Early									
ND146-4R	3.4	3.5	3.3	1.2	89.5	0.9	0.2	8.9	89.9
Norland	6.6	6.7	2.3	2.9	82.0	1.3	3.6	5.5	90.0
Medium to Late									
Neb. A129.69-1	10.8*	2.5	4.7	6.1	81.0	2.1	0.2	5.4	92.3
Neb. A219.70-3	20.6*	9.1*	5.3	5.7	64.9	7.8	0.9	10.9*	80.4
Neb. 7.67-1	4.1	4.4	2.3	3.5	86.6	0.8	2.0	5.1	92.1
Minn. 9781	8.2	6.7	12.8	5.1	70.9	0.7	4.5	4.7	90.1
Minn. 8777	6.9	3.0	3.4	3.4	84.3	0.7	9.1*	13.3*	77.5
Minn. 10162	7.9	1.2	11.5	3.9	76.5	0.1	0.9	8.4	90.9
Wisc. 726	6.2	1.2	6.4	11.0*	77.4	0.3	3.3	10.1	86.5
Wisc. 774R	4.1	2.8	5.9	2.1	86.0	0.1	5.9	5.1	89.0
La. 7196	11.1*	1.8	5.1	7.9	74.2	0.3	3.3	8.3	88.1
La. 31-124	7.6	1.7	11.3	5.3	75.6	0.9	10.9*	6.6	81.5
ND119-3	2.9	2.7	4.6	5.3	85.5	0.3	1.3	3.8	94.6
ND55-7	3.3	1.6	2.5	4.4	88.1	1.3	4.4	6.5	89.8
Red Pontiac	8.6	5.6	12.7*	3.7	70.7	2.9	1.8	6.5	89.1
Russet Burbank	0.4	4.5	23.4*	1.9	72.3	*4.5	5.7	2.9	86.3
Norchip	3.3	5.4	8.1	8.7	76.9	0.9	5.2	8.2	86.2
Average	6.9	9.1	12.7	4.8	79.0	1.5	3.7	7.1	87.9

1/ Percent normal tubers showing no defects (some individuals had more than one type of defect).

* Possible weakness of cultivar or clone.

North Central Regional Table 8. Chip Quality - 1981.

Cultivar	Alb[1]	Manit[1]	Ind[2]	Iowa[3]	Kansas[3]	Ken[1]	La[2]	Mich[2]	Minn[3]	Mo[2]	Neb[2]	N.D[1]	Ohio[1]	S.D[3]	Wisc[2]
Early to Medium Early															
ND146-4R	32.5	55.0	2.0			63	2.4	2.0		2.0	2.0	41	70		6.0
Norland	21.9	45.0	4.0			43	4.2	3.0		4.0	4.0	44	72		6.0
Medium to Late															
Neb. A129.69-1	17.6	37.5	4.0			44	5.2	3.0		3.0	4.0	36	61		5.5
Neb. A219.70-3	21.7	47.3	7.0			47	7.8	3.5		3.0	4.0	34	60		6.3
Neb. 7.67-1	20.1	54.3	5.0			34	7.6	2.0		3.0	3.0	40	66		6.5
Minn. 9781	30.3	41.3	4.0			40	3.4	2.5		3.0	3.0	40	67		5.3
Minn. 8777	20.5	32.0	8.0			55	5.6	2.5		2.0	3.0	29	61		8.0
Minn. 10162	42.6	56.3	2.0			54	3.2	1.0		2.0	2.0	43	71		3.6
Wisc. 726	36.3	51.8	3.0			56	--	1.5		1.0	3.0	42	70		3.6
Wisc. 774R	16.6	37.3	9.0			39	--	4.0		4.0	5.0	26	63		9.0
La. 7196	22.2	36.5	8.0			43	5.6	3.0		4.0	3.0	24	60		9.0
La. 31-124	23.8	30.8	7.0			47	4.8	2.5		4.0	5.0	37	64		6.0
ND119-3	36.3	51.0	2.0			61	4.4	1.0		3.0	2.0	41	73		5.0
ND55-7	35.8	58.0	3.0			61	3.4	1.5		3.0	2.0	45	64		3.6
Red Pontiac	14.1	34.3	9.0			32	7.0	4.5		3.0	5.0	28	52		9.0
Russet Burbank	31.3	47.0	6.0			45	5.8	3.0		2.0	4.0	33	65		5.2
Norchip	35.3	54.0	2.0			56	3.4	1.5		2.0	2.0	47	73		3.7
Average	27.0	45.3	5.0			48	4.9	2.3		3.0	3.0	37	65		6.0

1/ PCII Color Chart (1 lightest; 10 darkest)

2/ Agtron (Highest number lightest)

3/ No data reported.

North Central Regional Table 9. Early Blight[1/] - 1981.

Cultivar	Alb.	Manit.[2/]	Ind.[2/]	Iowa	Kansas	Ken.[2/]	La.[2/]	Mich.[2/]	Minn.	Mo.[2/]	Neb.	N.D.	Ohio[2/]	S.D.	Wisc.
Early to Medium Early															
ND146-4R	5			3	1.0				1		2	2.1		3	4
Norland	5			3	1.0				1		2	1.0		3	1
Medium to Late															
Neb. A129.69-1	5			4	5.0				3		4	5.0		4	3
Neb. A219.70-3	5			4	4.3				3		4	5.0		4	4
Neb. 7.67-1	5			4	3.3				4		1	2.9		4	1
Minn. 9781	5			4	2.5				3		1	4.0		4	1
Minn. 8777	5			4	4.5				3		3	5.0		4	1
Minn. 10162	5			4	3.8				3		3	4.0		4	2
Wisc. 726	5			4	3.5				3		4	3.9		4	1
Wisc. 774R	5			4	3.0				4		4	3.9		-	2
La. 7196	5			4	4.0				3		3	5.0		4	1
La. 31-124	5			4	3.5				4		4	4.3		4	1
ND119-3	5			4	1.5				1		1	2.1		4	4
ND55-7	5			4	2.8				5		2	4.1		4	3
Red Pontiac	5			4	3.3				3		3	3.6		4	2
Russet Burbank	5			4	5.0				3		3	5.0		4	2
Norchip	5			4	3.0				4		2	3.8		5	1

1/ Early Blight; 1 susceptible; 5 highly resistant
2/ No data reported.

North Central Regional Table 10. Merit Ratings[1/] - 1981.

Cultivar	Alb.	Manit.	Ind.	Iowa	Kansas	Ken.	La.	Mich.	Minn.	Mo.	Neb.	N.D.	Ohio	S.D.	Wisc.	Total Points
Early to Medium Early																
ND146-4R	1	5				5	5	3		4		5			4	32
Norland		4		1												5
Medium to Late																
Neb. A129.69-1	5			5	4			5		3	4		4	5		35
Neb. A219.70-3				2	5		3	1					3			14
Neb. 7.67-1					1					2				2	1	6
Minn. 9781																0
Minn. 8777		2			2	2		4	5		1	3	5		5	29
Minn. 10162			4	4			4					2				14
Wisc. 726	2	3	5		3			2	3	1	2		1		2	24
Wisc. 774R			3						1			1			3	8
La. 7196							2									2
La. 31-124																0
ND119-3	4		2			3										9
ND55-7						4			2		5	4		4		19
Red Pontiac			1										2	3		6
Russet Burbank		1							4							5
Norchip	3			3		1	1			5	3			1		17

1/ Merit Ratings

Rating	Points
1	5
2	4
3	3
4	2
5	1

WESTERN REGIONAL POTATO VARIETY TRIAL - 1981

J. J. Pavek, D. L. Corsini, and Cooperators[1/]

The 1981 Western Regional Potato Variety Trial was uniformly grown at eleven locations. The trial consisted of 10 entries including seven experimental clones. The trial locations, planting, vine kill, and harvest dates, and days from planting to harvest were as follows:

State/ Province	Location	Planting Date	Vine Kill Date	Harvest Date	Days To Harvest
Alberta	Brooks	5 13	9/10	10/1	141
California	Kern Co.	2/26	-	6/22	116
"	Tulelake	5/12	9/2	9/29	136
Colorado	San Luis Valley	5/13	9/9	9/15	125
Idaho	Aberdeen	5/7	9/8	10/9	155
"	Kimberly	4/30	-	10/7	160
Oregon	Hermiston	4/7	9/9	9/21	167
"	Malheur Co	4/23	10/1	10/7	166
Washington	Othello	4/15	-	10/23	161
"	Prosser	4/24	9/9	9/15	144
Wyoming	Torrington	5/21	9/14	9/24	126

Cultural practices, use of fertilizer, pesticides, irrigation, and vine killing varied according to local conditions. All locations were irrigated on a regular schedule throughout the entire growing season. Temperatures across the region averaged somewhat below normal through July and then considerably above normal to the end of the season. Heat and moisture stress caused severe yield problems at Torrington and serious malformations, etc. at Brooks. Severe internal quality problems were experienced with the Russet Burbank control in the Columbia Basin (Washington, Hermiston, Oregon). Data on tuber yields, vine and tuber characteristics, and merit ratings are presented in Western Tables 1 through 7. Experimental clones to be retained in the 1982 trials are A72685-2 and AD74135-1.

[1/] Alberta, D. Lynch; California, R. Voss; Colorado, J. Twomey, D. Holm; Idaho, G. Kleinschmidt, S. Michener; Oregon, A. Mosley, D. Hane, C. Stanger, G. Carter; Washington, M. Martin, W. Iritani, N. Holstad; Wyoming, K. Bohnenblust.

Western Table 1. Total yield cwt/acre.

Entry	Alb[3]	California		Colo	Idaho		Oregon		Washington		Wyo[1/3]	Overall Mean[2]
		Kern	Tul	SLV[3]	Ab	Kim	Herm[3]	Mal	Oth	Pros		
A72545-2	373	365	425	318	268	403	697	317	720	711	82	460
A72685-2	393	510	315	339	324	497	743	258	713	908	135	500
AD7267-1	375	500	370	240	285	364	501	169	651	582	84	404
AD7377-1	361	320	485	334	300	489	669	226	655	588	60	443
AD74135-1	470	450	505	392	279	555	492	275	730	713	173	486
WnC521-12	417	-	460	324	286	432	564	376	643	697	88	463
WnC672-2	316	520	630	302	335	493	716	290	-	675	128	495
Lemhi Russet	400	470	475	-	409	551	561	322	631	693	-	486
Norchip	384	300	370	302	287	423	502	285	425	584	316	386
Russet Burbank	314	345	500	245	286	452	489	316	480	660	130	409
Location Means	380	421	454	315	306	466	593	283	632	681	134	453

1/ Wyoming data not used in calculation of overall mean and in analysis of variance.

2/ LSD @ 5% = 60 cwt (using locations as reps).

3/ Sencor used for weed control.

Western Table 2. Yield of U.S. No. 1's, cwt/acre and percent.

Entry	Alb	California		Colo	Idaho		Oregon		Washington		Wyo[1]	Overall Mean[2]
		Kern	Tul	SLV	Ab	Kim	Herm	Mal	Oth	Pros		
A72545-2	140[3]	345	325	230	238	340	630	236	613	637	57	373
	38	95	76	72	89	84	90	74	85	90	70	81
A72685-2	92	475	230	285	284	436	669	189	539	744	80	394
	23	93	73	84	88	88	90	73	76	82	59	79
AD7267-1	87	465	255	168	234	320	392	129	562	505	58	312
	23	93	69	70	82	88	78	76	86	87	69	77
AD7377-1	86	285	395	253	253	385	564	140	482	509	35	335
	24	89	81	76	84	79	84	62	74	87	58	76
AD74135-1	171	395	400	302	208	411	406	176	525	580	125	357
	36	88	79	77	75	74	83	64	72	81	72	73
WnC521-12	112	-	385	258	235	378	526	310	514	598	68	373
	27	-	84	80	82	88	93	82	80	86	77	81
WnC672-2	121	490	525	225	268	422	640	223	-	566	59	404
	38	94	83	75	80	86	89	77	-	84	46	82
Lemhi Russet	131	440	355	-	267	471	513	211	536	570	-	376
	33	94	75	-	65	85	91	66	85	82	-	77
Norchip	132	255	265	200	166	325	403	189	334	489		276
	34	85	72	66	58	77	80	66	79	84	66	72
Russet Burbank	52	285	335	136	173	292	321	230	294	511	26	263
	17	83	67	56	60	65	66	73	61	74	20	64
Location Means	112	385	347	232	233	378	506	203	496	571		346

[1] Wyoming data not used in calculation of overall mean and in analysis of variance.

[2] LSD @ 5% = 55 cwt (using locations as reps).

[3] Top figure is cwt/acre, lower is % of total yield.

Western Table 3. U.S. No. 1's over 10-12 oz, percent of total yield.*

Entry	Alb	California		Colo	Idaho		Oregon		Washington		Wyo	Overall Mean
		Kern	Tul	SLV	Ab	Kim	Herm	Mal	Oth	Pros		
A72545-2	23	1	25	21	34	66	-	15	55	49	2	34
A72685-2	11	15	14	27	35	66	-	18	47	35	3	31
AD7267-1	10	7	32	23	30	67	-	34	60	46	0	34
D7377-1	12	3	22	24	35	32	-	9	43	23	0	27
D74135-1	12	7	24	21	14	48	-	6	44	35	0	27
WnC521-12	21	-	43	27	33	62	-	39	49	52	2	39
WnC672-2	15	11	20	11	12	43	-	22		47	0	26
Lemhi Russet	22	10	23	-	22	61	-	12	47	34	-	30
Norchip	25	0	4	4	1	21	-	6	15	12	0	10
Russet Burbank	9	3	14	4	6	38	-	25	29	24	8	19
Location Means	16	8	23	19	22	52	-	19	44	36	-	28

*Greater than 12 oz for California and Prosser, Washington; greater than 10 oz for rest.

Western Table 4. U.S. No. 2's and culls over 4 oz, percent of total yield.

Entry	Alb	California		Colo	Idaho		Oregon		Washington		Wyo	Overall Mean
		Kern	Tul	SLV	Ab	Kim	Herm	Mal	Oth	Pros		
A72454-2	58	3	15	3	0	6	1	0	6	3	0	8
A72685-2	75	3	16	4	1	5	3	1	11	9	6	12
AD7267-1	75	2	18	13	5	5	10	6	7	6	4	14
AD7377-1	76	6	11	14	5	15	10	4	14	5	3	15
AD74135-1	62	6	10	13	2	20	6	3	16	8	7	15
WnC521-12	50	-	13	15	4	6	2	3	11	6	1	11
WnC672-2	56	2	14	12	2	4	7	2	-	9	1	10
Lemhi Russet	66	2	17	-	16	9	4	8	5	8	-	13
Norchip	57	7	22	19	3	6	6	14	4	7	1	14
Russet Burbank	82	10	19	19	9	30	14	12	20	11	25	21
Location Means	65	4	15	12	5	11	6	5	10	7	-	13

Western Table 5. Specific gravity.

Entry	Alb	California		Colo	Idaho		Oregon		Washington		Wyo	Overall Mean 1/
		Kern	Tul	SLV	Ab	Kim	Herm	Mal	Oth	Pros		
A72545-2	1.098	1.076	1.091	1.096	1.096	1.078	1.078	1.093	1.081	1.074	1.075	1.085
A72685-2	117	85	94	103	102	83	82	100	82	82	88	93
AD7267-1	85	67	73	75	80	69	70	75	70	66	71	73
AD7377-1	90	68	78	86	79	67	75	81	70	65	65	75
AD74135-1	104	76	94	94	91	82	79	94	77	72	86	86
WnC521-12	98	-	103	105	109	92	96	108	90	88	95	98
WnC672-2	125	81	98	102	104	85	83	98	-	81	79	93
Lemhi Russet	102	79	86	-	106	88	85	103	83	84	-	91
Norchip	87	71	82	93	89	76	81	88	76	76	84	82
Russet Burbank	93	84	94	96	91	75	84	87	81	78	78	86
Location Means	100	78	89	95	95	80	81	93	80	77	81	86

1/ LSD @ 5% = .004, using locations as reps.

Western Table 6. Summary of vine characteristics.

Entry	Seed Source	Stand % [1/]	Seedborne Virus [2/]	Vine Size [3/]	Vine Maturity [4/]	Vert Wilt [5/]	Early Blight [6/]
A72545-2	Or	84	30	Lrg	3.8	1.5	1.7
A72685-2	Or	87	0	M.Lrg	3.8	1.8	2.2
AD7267-1	Or	94	25	M.Lrg	3.2	3.0	2.8
AD7377-1	Or	88	15	M.Lrg	3.3	2.6	2.8
AD74135-1	Or	93	10	M.Lrg	3.3	2.4	1.1
WnC521-12	Co	84	0	Lrg	3.0	3.0	2.8
WnC672-2	Co	92	0	M.Lrg	2.8	2.1	3.4
Lemhi Russet	Id/Or	93	0	Lrg	3.4	3.9	3.4
Norchip	Id	95	0	M.Sm	3.3	4.4	4.5
Russet Burbank	Or	98	15	M.Lrg	3.7	4.4	3.9

[1/] Mean of 10 locations.
[2/] Visual symptoms of mosaic, Aberdeen and Kimberly.
[3/] Aberdeen.
[4/] Mean of 8 locations, 1 (early) to 5 (very late).
[5/] Verticillium wilt, 0 (none) to 5 (severe); mean of 3 locations.
[6/] Early blight 0 (none) to 5 (severe); Aberdeen.

Western Table 7. Tuber type, scab, and merit rating scores.

Entry	Tubers[1/]			Merit Rating Scores[2/]									Total
					Calif.		Idaho		Ore.	Wash.			
	Shape	Skin	Scab	Alb	Kern	Tul	Ab	Kim	Herm	Oth	Pros	Wyo	Score
A72545-2	O	Buff	1.8	4	2	.	.	2	2	.	.	.	10
A72685-2	O	Rus.	1.3	.	.	.	5	5	5	3	5	4	27
AD7267-1	L-O	Rus.	0.9	.	5	.	.	3	.	.	.	1	9
AD7377-1	L-O	Rus.	0.1	.	1	2	4	.	3	2	.	.	12
AD74135-1	L-O	Rus.	0.9	1	4	4	2	1	.	.	1	5	18
WnC521-12	R-O	Buff	1.3	2	.	3	.	.	4	4	.	2	15
WnC672-2	R-O	Buff	0.9	.	3	5	.	.	.	.	2	3	13
Lemhi Russet	L-O	Rus.	0.5	5	.	1	3	4	1	5	4	.	23
Norchip	R	White	0.9	3	.	.	.	.	.	1	.	.	4
Russet Burbank	L	Rus.	0.1	.	.	.	1	.	.	.		.	4

1/ Shape: O = oblong, R = round, L = long; Skin: Buff = scaly, not smooth and white, Rus. = russet.
Scab: 0 (none) to 5.0 (most severe); means of 5 locations.

2/

Merit Rating	
Rank	Score
1	5
2	4
3	3
4	2
5	1

1981 POTATO VARIETY EVALUATIONS

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A. Dates of Harvest of Several Potato Varieties

The intensive dates-of-harvest study is conducted each year at the Montcalm Research Farm. Three blocks, each containing 112 ten foot plots were planted May 6, 1981. Each block contained 28 varieties and advanced selections planted in a randomized complete block design with four replications. One block was harvested August 11, a second on August 31 and the third on September 22. At each date, yields, specific gravity and chip scores were determined.

The plot area received 200 lbs/A plow down of 0-0-60, 500 lbs/A 20-10-10 and 150 lbs/A 45-0-0 sidedressed. The plowdown crop was a one year old stand of alfalfa. Temik at 20 lbs/A was applied at planting. Alachlor (Lasso) 2 lbs/A was applied soon after planting as early preemergence and metribrizen (Sencor) 0.5 lbs/A was applied delayed preemergence. The plots were irrigated.

Results

The yield performance at each date of harvest is summarized in Table 1. There was no yield increase between the second and third harvest which was due in part to an increased rate of growth during the season so that many varieties appeared to mature earlier than normal. There also was a definite curtailment in growth in September after the application of copper.

Yields in general were very desirable. Varieties which produced very acceptable yields before September were Atlantic, Crystal, Belchip, Onaway, Pioneer, Rideau, MS402-1, MS108-5, and Wis 718. Chipbelle, Denali, Lemhi, Michimac, Monona, Russet Burbank and CA027 would be judged as later maturing varieties.

Table 2 summarizes the specific gravity and chip quality of each variety. Overall there was no appreciable change in specific gravity between harvests. Varieties which show exceptionally high specific gravity are Chipbelle, Denali and Atlantic. All varieties except Onaway produced acceptable chips at most harvests. Several of the later maturing varieties produced darker chips at the early harvest, particularly if held for one week. Table 3 summarizes the internal and external defects which were observed. Hollow heart, growth cracks and second growth were all minimal. Vascular discolorations were observed in most varieties, however for the most part these were only slight. Dakchip exhibited the most severe vascular discoloration.

Variety Observations

Allagash Russet - yields were below average at all harvests, primarily reflecting a lack of adequate tuber sizing. Specific gravity is also low. Similar results were noted in 1980.

Atlantic - continues to produce very satisfactory yields and consistently high specific gravity. It produces very acceptable potato chips and it appears to be a variety with a fairly wide range in marketable harvest. With its wide adaptability including the southern states, this variety could become a year-around chipping variety.

Belchip - yielded well above the average with medium-high specific gravity. Tuber type and appearance were very good in 1981 and defects were minimal. Maturity is somewhat later than Atlantic.

Chipbelle - appears to be a late maturing variety with exceptionally high specific gravity at each harvest and above average yields. Tuber shape is oval to oblong. The plant is very susceptible to metribuzin (Lexone/Sencor). Chip color has been very good and comparable to Monona and Atlantic.

Crystal - appears to set and size tubers early. Tubers have a bright skin, however if scab is present it is often the deep and pitted scab. Bruising and susceptibility to storage problems have been reported.

Dakchip - yields were above average, however specific gravity is medium to low and it did decline with delayed harvest. Vascular discoloration was severe and this has been noted in previous years. It has a very short dormancy.

Denali - a late maturing variety which yielded well above average. Specific gravity is very high. It has a low tolerance to scab and fields with a history of scab should be avoided.

Highlat Russet - exceptionally low yields with inadequate tuber sizing. Released from Alaska in 1980 for specific markets in Alaska. It does not appear to be well adapted to Michigan.

Jemseg - an early maturing round white with some skin netting. Yields were below average.

Lemhi - yields were well above average and tuber type and shape were very attractive with a higher percentage of U.S. No. 1's than Russet Burbank. It appears to size tubers earlier than Russet Burbank, however hollow heart and blackspot are two serious problems at this point.

Michimac - a late maturing round white with high yields. Appears most suitable for fresh pack from a later harvest or out of storage. Appears to have a low tolerance to scab.

Monona - included as a check variety. Yields were average at the late harvest. Specific gravity was low and chip quality was excellent.

Oceania - yields were slightly below average. Tubers are attractive with shallow eyes and it has low specific gravity. Would appear most suitable for fresh pack.

Onaway - included as a check variety. Yields well above average and type was very good.

Pioneer - a long red variety being evaluated as a potential for early harvest frozen processing. Sets and sizes tubers early with very good yields.

Rideau - a medium-late round red variety with very good color. Yields above average at the later harvests.

Russette - yields were slightly below average. During both 1980 and 1981 hollow heart has been prevalent in this variety although it was not observed in these plots.

Russet Burbank - included as a late maturing check variety. Sizing did not continue after the second harvest which is not normal. Tuber type and quality were very good in 1981.

Superior - yields were very good in 1981.

Yukon - a golden flesh variety which has good yields and very acceptable tuber shape and appearance. Specific gravity readings were consistently above 1.080.

B8972-1 - a russet selection from the USDA-Beltsville program. Tuber sizing was very poor with a high percentage of tubers under 2 inch at all harvests. Yields were very low.

CA-027 - is a late maturing selection from Maine. It yields well above average and appears most suitable as a fresh pack potato.

C-13 - is an advanced selection from the Campbell Co. Yields were below average however tuber shape and appearance were very good.

MS108-5 - is an advanced selection which yielded well above average. Individual tuber sizing is not adequate and at locations where there is a stress, the percentage of tubers under 2 inch increases rapidly. The selection is being deleted.

MS401-2 - matures early and produces tubers which are smooth and sized well. It has a low specific gravity.

MS402-1 - medium maturity with average yields. Tubers sized well and were smooth and well shaped. It has been observed to have some tolerance to scab at some locations.

MS402-5 - has yielded below average and will be deleted.

Wis 718 - yielded exceptionally well with a high percentage of tubers over 3 1/4 inch. On larger tubers hollow heart has been observed. Specific gravity is low and it appears most suited to the fresh pack market.

TABLE 1 THE YIELD & SIZE DISTRIBUTION OF SEVERAL POTATO VARIETIES HARVESTED ON 3 SEPARATE DATES MEF 1981

HARVEST DATE	August 11					August 31					September 22				
			Percent					Percent					Percent		
Variety	Total (cwt/A)	No.1 (cwt/A)	2"-10oz	Over 10oz	B's	Total (cwt/A)	No.1 (cwt/A)	2"-10oz	Over 10oz	B's	Total (cwt/A)	No.1 (cwt/A)	2"-10oz	Over 10oz	B's
Allagash R.	280	229	81	0	19	274	223	81	0	18	278	217	78	0	22
Atlantic	423	376	82	7	9	471	440	82	11	7	451	412	86	5	9
Belchip	321	296	89	3	8	440	403	79	13	7	421	385	76	15	9
Chipbello	363	334	88	4	8	415	377	89	2	9	451	413	89	3	7
Crystal	409	350	84	4	15	484	421	86	1	13	485	432	86	3	10
Dakchip	359	313	85	2	12	401	358	87	3	10	393	329	78	6	16
Denali	332	305	87	4	9	455	426	88	6	7	476	431	86	4	8
Highlat	203	136	67	0	33	261	184	70	0	29	223	148	66	0	34
Jemseg	253	230	88	2	9	311	288	87	5	6	277	248	85	5	10
Lemhi	350	298	77	8	14	459	394	65	20	13	499	427	72	13	13
Michimac	323	298	90	2	8	467	432	82	10	8	477	434	87	4	9
Monona	288	261	87	3	10	338	313	86	6	7	395	363	85	8	6
Oceania	351	319	87	3	9	367	319	80	7	13	385	356	86	6	8
Onaway	388	373	84	12	4	442	422	85	10	5	426	402	73	21	5
Pioneer	430	390	72	19	9	471	434	83	9	7	479	435	78	13	9
Rideau	307	290	93	2	6	448	447	84	12	3	413	385	76	17	5
Russette	292	263	85	5	8	346	323	85	8	6	359	326	89	2	9
R. Burbank	280	215	77	0	19	375	286	71	5	18	370	287	75	3	20
Superior	277	252	94	0	6	330	305	90	2	7	335	298	89	0	10
Yukon	309	286	89	4	7	357	332	85	8	6	351	328	82	12	6
B8972-1	280	188	67	0	33	261	157	60	0	40	256	126	50	0	50
CA 027	282	240	81	5	14	417	396	88	7	5	488	452	81	11	6
C13	334	311	79	14	6	330	305	84	8	7	287	257	65	24	9
MS 108-5	378	306	81	0	19	470	400	84	0	14	501	421	84	0	16
MS 401-2	232	203	88	0	12	244	205	84	0	15	250	201	81	0	19
MS 402-1	352	327	90	3	6	392	357	86	5	9	343	309	86	4	9
MS 402-5	303	246	79	2	19	334	292	86	1	13	349	295	84	0	16
WIS 718	367	340	89	3	8	524	507	59	36	5	512	487	75	20	5
Average	324	285				389	348				390	343			

TABLE 2. THE SPECIFIC GRAVITY & CHIP QUALITY OF SEVERAL POTATO VARIETIES HARVESTED ON 3 SEPARATE DATES MEF-1981

Harvest Date	August 11			August 31			September 22	
		chip score*			chip score*			chip score*
Variety	Specific Gravity	1 day	7 days	Specific Gravity	1 day	7 days	Specific Gravity	November 19
Allagash R.	1.071	1.0	1.5	1.066	1.0	1.0	1.068	1.5
Atlantic	1.094	1.0	2.5	1.091	1.0	1.0	1.091	1,0
Belchip	1.085	1.0	1.5	1.080	1.0	1.0	1.083	1.0
Chipbelle	1.100	1.5	2.0	1.100	1.0	1.0	1.100	1.0
Crystal	1.074	1.5	2.5	1.074	1.0	1.5	1.079	1.5
Dakchip	1.077	1.0	1.5	1.073	1.0	1.0	1.069	2.0
Denali	1.093	1.0	2.0	1.093	1.0	1.5	1.094	1.5
Highlat	1.069	1.0	2.0	1.067	1.5	1.5	1.066	2.5
Jemseg	1.073	1.5	2.0	1.074	1.0	1.5	1.072	3.5
Lemhi	1.081	2.5	3.0	1.084	1.0	1.0	1.084	1.5
Michimac	1.072	2.0	3.0	1.073	1.0	2.0	1.069	2.0
Monona	1.070	1.0	1.0	1.068	1.0	1.0	1.071	1.0
Oceania	1.068	2.0	2.0	1.066	1.0	1.0	1.065	2.0
Onaway	1.070	3.0	4.0	1.068	3.0	3.0	1.065	4.0
Pioneer	1.075	1.5	2.5	1.076	1.5	1.5	1.075	1.5
Rideau	1.076	2.5	2.0	1.078	1.5	1.5	1.077	2.5
Russette	1.079	2.0	2.0	1.081	1.5	1.5	1.081	3.5
R. Burbank	1.079	2.5	2.5	1.080	1.5	2.5	1.078	3.0
Superior	1.077	1.5	1.5	1.075	1.5	1.5	1.076	1.5
Yukon	1.085	1.5	1.5	1.082	1.0	1.5	1.084	2.0
B8972-1	1.079	1.0	2.0	1.079	1.0	1.5	1.076	1.5
CA 027	1.078	1.5	3.0	1.082	1.0	1.0	1.079	1.5
C13	1.083	1.0	1.0	1.074	1.0	1.0	1.077	1.5
MS108-5	1.082	1.0	2.0	1.084	1.5	1.5	1.082	2.5
MS401-2	1.071	1.0	1.0	1.071	1.0	1.0	1.071	3.0
MS402-1	1.071	1.0	1.5	1.071	1.0	1.5	1.069	1.5
MS402-5	1.082	1.0	1.0	1.075	1.0	1.0	1.077	1.5
WIS718	1.073	1.5	1.5	1.066	1.0	1.5	-----	
Average	1.078			1.077			1.077	

*chip score based on 1-5 scale 1= light & very acceptable; 5 = dark and not acceptable

TABLE 3. THE INCIDENCE OF EXTERNAL* & INTERNAL DEFECTS* ON SEVERAL POTATO VARIETIES MEF 1981

	External			Internal		
Variety	Second Growth	Growth Crack	Scab	Vascular Discoloration	Internal Necrosis	Hollow Heart
Allagash R.	---	---	---	---	---	---
Atlantic	---	---	---	2 sl	---	---
Belchip	1	---	---	2 sl, 2 sev	---	---
Chipbelle	---	---	---	4 sl	---	---
Crystal	---	---	---	2 sl	---	---
Dakchip	---	---	1	2 sl, 12 sev	---	---
Denali	---	---	---	1 sl, 1 sev	---	---
Highlat	---	---	---	2 sl	---	---
Jemseg	---	---	---	1 sl	---	---
Lemhi	---	---	---	4 sl	---	1
Michimac	---	---	1	4 sl, 5 sev	---	---
Monona	---	---	---	2 sl	---	---
Oceania	---	---	---	1 sl	---	---
Onaway	---	---	---	2 sl	1 br center	---
Pioneer	---	---	---	---	---	---
Rideau	---	---	---	2 sl	---	---
Russette	---	1	1	---	---	---
R. Burbank	1	---	---	3 sl	---	---
Superior	---	---	---	2 sl	1 br center	---
Yukon	---	---	1	3 sl	---	---
B8972-1	1	---	---	2 sl	---	---
CA 027	---	---	---	9 sl	---	---
C 13	---	---	---	2 sl	---	---
MS 108-5	---	---	---	---	---	---
MS401-2	---	1	---	---	---	---
MS402-1	---	---	1	---	---	---
MS402-5	---	---	---	3 sl, 1 sev	---	---
WIS 718	---	---	---	---	---	---

* Based on observations of 25 tubers selected at random from the Sept. 22 harvest.
sl = slight; sev = severe; br = brown

Storage evaluations

Table 4 summarizes the culinary quality of these several varieties after 3 months storage at 52F. Generally speaking after-cooking-darkening (ACD) ratings were poorer than other years. In some varieties such as Atlantic, Crystal, Denali, Oceania, Onaway, Pioneer, Rideau, Russet Burbank, Superior, Yukon, B8972-1 and C13 the cooking quality in terms of color was very desirable. Varieties with high specific gravity such as Atlantic, Chipbelle and Denali tend to slough more than do varieties with lower dry matter. Several varieties had the ACD confined to the area outside of the vascular ring and generally was most pronounced on the stem end, which is very typical of this reaction. Similiar samples stored at 40° will be evaluated in February.

Several of the selections remained in very acceptable chipping condition during this storage period. Atlantic, Belchip, Monona, Chipbelle and Allagash Russet remained in the most desirable chipping condition and were closely followed by Crystal, Denali, Superior, B8972-1, C-13, CA 027, MS402-5, Dakchip and Lemhi. Dakchip was badly sprouted at the end of the storage period and of all these varieties displayed the shortest rest period. Similiar samples have also been stored at 40F and these will be removed in February for reconditioning and the determination of their ability to produce an acceptable chip color.

Table 4. The after-cooking-darkening[1] and chip rating[2] of several varieties held in storage at 52°F

Variety	Hours after cooking			Chip score
	0	1	24	
Allagash Russet	1.0	2.0	3.5	1.0
Atlantic	1.5	1.5	1.5	1.0
Belchip	1.5	2.0	2.5	1.0
Chipbelle	2.0	3.0	3.0	1.0
Crystal	1.0	1.0	1.0	1.5
Dakchip	1.5	2.0	2.0	1.5
Denali	1.5	1.5	1.5	1.5
Highlat	1.0	1.5	2.0	2.0
Jemseg	1.5	2.0	2.0	3.5
Lemhi	1.0	2.0	2.0	1.5
Michimac	2.0	3.5	3.5	3.5
Monona	1.0	2.0	2.0	1.0
Oceania	1.0	1.5	1.5	2.0
Onaway	1.0	1.5	1.5	4.0
Pioneer	1.5	1.5	1.5	2.5
Rideau	1.0	1.5	1.5	3.0
Russette	1.5	2.0	2.0	3.0
R. Burbank	1.0	1.0	1.0	3.5
Superior	1.0	1.5	1.5	1.5
Yukon	1.0	1.0	1.0	3.0
B8972-1	1.0	1.5	1.5	1.5
CA 027	3.0	3.0	3.5	1.5
C 13	1.0	1.5	1.5	1.5
MS 108-5	1.5	2.0	2.0	2.5
MS 401-2	1.0	2.0	2.0	3.0
MS402-1	1.0	2.0	2.0	2.5
MS402-5	1.0	1.5	1.5	1.5

[1] *Ratings based on a 1-5 scale. 1 = clear with no after cooking darkening 5 = undesirable greyish black discoloration throughout the flesh*

[2] *Chip score based on a 1-5 scale. 1 = light color and very acceptable 5 = dark color and not acceptable*

B. *10 Hill Observation Plots*

Very few selections were planted in 10 hill observation plots as most seed was sufficient enough to plant in a replicated plot. Following are the four selections observed in a single 10 hill plot.

Selection	Total cwt/A	US No. 1 cwt/A	Percent Under 2"	Percent Over 3 1/4	Percent 2-3 1/4
Shepody	390	335	10	10	76
Snowchip	538	484	9	0	90
G 670-11	577	546	3	27	68
B 8833-6	257	156	36	0	61

C. *Overstate Potato Variety Trials*

Overstate potato variety trials are planted as single row, result-demonstration plots in order to incorporate commercial handling of the seed and harvest. Plots were established at DuRussel Brothers in Manchester, Gordon Corrion in Munger, Leroy Woloszyk in Posen, Hank and Andy Leep at Shelbyville, and Carl and George Horkey at Dundee. Half acre plantings of several varieties were also evaluated at the Wayne Lennard Farm in Samaria.

Except at the Lennard Farm, approximately 35 pounds of seed of each variety was provided to the cooperating grower. The seed was cut in their mechanical cutter and then planted with their planter. The results are summarized in Table 5. Data from the Corrion and Horkey Farms are not included because of water damage to the plots during September and October. There was a significant range in climatic conditions between locations. Extremely dry conditions prevailed during the growing season in the northern Lower Peninsula and this is reflected in the lower yields and high specific gravity at the Woloszyk Farm.

Varieties which seemed to yield consistently well were Atlantic, Chipbelle, Crystal, Denali and Wis 718. Scab was very prevelant with the plot area at Allegan and was most severe on Crystal, Denali and Dakchip. When scab is present it frequently appears as the deep, pitted type on the Crystal variety. Dakchip has not yielded well and vascular discolorations have been frequently observed. Internal defects were less in 1981 than in 1980. Hollow heart was observed on Wis 718, Russette, Allagash Russet, Lemhi and Atlantic. Russette, Oceania and Rideau were observed to be slower in emergence and in early season vigor.

Table 5. The yield and specific gravity of several potato varieties grown at out-state locations in 1981.

Variety	Leep, Allegan County			Woloszyk, Presque Isle County			DuRussel, Washtenaw County			Lannard, Monroe County	
	Total (cwt/A)	No. 1 (cwt/A)	Specific Gravity	Total (cwt/A)	No. 1 (cwt/A)	Specific Gravity	Total (cwt/A)	No. 1 (cwt/A)	Specific Gravity	Total (cwt/A)	Specific Gravity
Allagash Russet							220	186	1.058		
Atlantic	420	405	1.082	240	222	1.093				297	1.083
Belchip										352	1.078
Chipbelle	371	328	1.085	260	240	1.089	209	194	1.077	312	1.084
Crystal	401	374	1.070	217	176	1.086	406	381	1.064	346	1.070
Dakchip	333	320	1.065							226	1.065
Denali	453	443	1.083	199	165	1.093	394	363	1.081	288	1.087
Katahdin							276	265	1.066		
Lemhi							354	319	1.076	284	1.073
Michimac				304	263	1.074					
Oceania	292	272	1.066				261	231	1.057	334	1.066
Ontario				254	213	1.074					
Rideau				145	135	1.077	287	273	1.066		
Russette				199	171	1.090	348	293	1.066	289	1.077
B 7809-1							328	271	1.064		
CA 027				222	207	1.084					
MS 108-5	400	364	1.072	219	168	1.086	278	247	1.069		
MS 402-1	302	289	1.062	184	164	1.078	447	392	1.065	319	1.063
Wis 718							358	345	1.057	311	1.063
Average	372	349	1.073	222	193	1.084	321	289	1.067	305	1.074
Planted:	May 15, 1981			May 14, 1981			May 29, 191			April 5, 1981	
Harvested:	September 28, 1981			September 24, 1981			October 12, 1981			September 10, 1981	

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INTRODUCTION OF NEW VARIETIES

N.R. Thompson, R.W. Chase, R. Hammerschmidt, R.B. Kitchen

A. LEVERING SEED FARM

Sixty seven different cultivars or seed sources were planted as two cut units. A few units were rogued out because of rhizoctonia or weak growth. The more common virus diseases PVY, leaf roll and spindle tuber were not detected by visual symptoms. The crop was topkilled in mid-August and harvest was completed on September 3. This procedure is followed to minimize late season virus infections.

Mini bulk samples were collected for the winter testing program in Florida. Greenhouse tests will be conducted on the Russet Burbank, Katahdin, Jemseg, Onaway, Atlantic, Denali, Snowchip and G670-11 seed obtained from British Columbia to determine their freedom from PVX, PVY and spindle tuber. As testing techniques are established, it is planned to routinely test new selections that are introduced into the Levering seed plot program so that a nucleus of disease-free seed is available for the Michigan seed industry.

B. MSU ADVANCED SELECTIONS

Sixteen selections retained from the 8,000 new cultivars introduced in 1978 were planted in a replicated yield trial at the Montcalm Research Farm. Table 1. Several exhibited very desirable variety potential and will continue for further testing. Table 2 summarizes the culinary quality of these selections after 3 months storage at 52°F. Most of the selections remained in suitable chipping condition. Maturity has not been consistent with previous years.

C. U.S.D.A. - BELTSVILLE SELECTIONS

A major and continuing source of cultivars is from the USDA-Beltsville program. Eight seedlings were planted in replicated plots at the Montcalm Research Farm for two dates of harvest on August 26 and September 23. Table 3 summarizes the results of these two harvests. There was essentially no yield increase between the first and second harvest dates except for B7805-1 which is an attractive, smooth white skin potato.

Specific gravity readings for these selections are generally medium to low. There was some increase in specific gravity between the first and second harvests, particularly for B8528-3, B8943-4, B8822-9 and Russet Burbank.

TABLE 1. THE CHARACTERISTICS AND PERFORMANCE OF SEVERAL NEW MICHIGAN SELECTIONS

Cultivar	Flesh Color	Maturity	Total cwt/A	No. 1 cwt/A	% No. 1	% Over 3¼	Specific Gravity	Chip Rating	Comments
700-70	White	Late	536	467	87.1	8.8	1.089	1.5	Eyes slightly deep
700-79	White	Late	371	332	89.5	1.8	1.087	1.0	Smooth, uniform
700-83	White	Medium	552	485	87.9	13.4	1.081	1.5	Smooth, uniform
700-88	White	Medium	368	283	76.9	17.3	1.069	3.0	Pointed, rough
701-22	White	Late	336	322	95.8	20.8	1.086	1.5	Smooth, uniform
702-80	White	Medium	406	359	88.4	6.1	1.075	1.0	Deep eyes, blocky
702-91	White	Medium	542	479	88.4	7.3	1.084	1.5	Tendency to pointed shape
704-3	Golden	Early	349	306	87.7	13.4	1.073	2.0	Smooth, some sungreen
704-10	Golden	Medium	385	324	84.1	5.5	1.085	2.0	Small run
704-17	White	Medium	431	400	92.8	23.5	1.082	2.5	Some scab
709-21	White	Medium	306	281	91.8	21.7	1.074	2.5	Over-size, rough
714-10	White	Medium	367	300	81.7	2.7	1.077	3.0	Smooth, small run
716-15	White	Medium	367	326	88.8	5.5	1.092	1.5	Smooth, uniform
718-6	White	Late	358	339	94.7	36.9	1.083	1.5	Smooth, uniform
718-11	Golden	Early	336	287	85.4	4.2	1.079	1.0	Smooth, uniform
719-38	White	Early	388	353	91.0	11.0	1.078	2.0	Smooth, uniform
Onaway	White	Early	495	458	92.5	26.2	1.066	4.5	Slight greening
Superior	White	Early	403	373	92.6	2.1	1.075	2.0	Rough skin
Atlantic	White	Late	408	367	90.0	12.8	1.090	1.5	Smooth
Monona	White	Late	335	296	88.4	11.1	1.071	1.0	Rough

TABLE 2. THE AFTER- COOKING-DARKENING[1] (ACD) AND CHIP RATING[2] OF SEVERAL NEW MICHIGAN SELECTIONS STORED 3 MONTHS AT 52°F

Selection	Hours After Cooking*			Chip* Score
	0	1	24	
700-70	1.0	1.5	1.5	1.0
700-79	1.5	2.0	2.0	1.0
700-83	1.0	1.5	2.0	1.5
700-88	1.0	1.0	1.0	2.0
701-22	1.0	1.5	2.0	1.5
702-80	1.0	1.5	1.5	1.0
702-91	1.5	1.5	1.5	1.0
704-3	1.0	1.0	1.0	3.0
704-10	1.0	1.0	1.0	2.0
704-17	1.0	2.0	2.0	2.0
709-21	1.5	2.5	3.0	1.5
714-10	1.5	1.5	1.5	4.0
716-15	1.0	1.5	1.5	1.0
718-6	1.5	2.5	3.0	1.0
718-11	1.5	2.5	2.5	1.0
719-38	1.0	1.0	1.0	2.0
Onaway	1.5	3.5	3.5	4.0
Superior	1.0	2.0	2.0	1.5
Atlantic	1.5	1.5	2.0	1.0
Monona	1.0	2.0	2.0	1.0

[1] ACD scored on a 1-5 scale. 1 = clear with no darkening; 5 = undesirable grayish-black discoloration throughout the cooked flesh.

[2] Chip rating based on a 1-5 scale. 1 = light and very acceptable color; 5 = dark and not acceptable

* Determinations made December 17 and December 23, respectively.

TABLE 3. THE YIELD, SIZE DISTRIBUTION & SPECIFIC GRAVITY OF SEVERAL USDA-BELTSVILLE SELECTIONS HARVESTED ON TWO DATES. MEF 1981

	August 26, 1981							September 23, 1981						
	yield(cwt/A)		Percent size distribution					yield(cwt/A)		Percent size distribution				
	Total	No. 1	2-3¼	Over 3 ¼	B's	Pick outs	Specific Gravity	Total	No. 1	2-3¼	Over 3 ¼	B's	Pick outs	Specific Gravity
B7154-10	471	386	82	0	16	2	1.060	457	399	87	1	11	1	1.063
B7516-7	312	275	86	2	12	0	1.077	303	259	83	3	14	0	1.077
B7805-1	417	385	86	7	5	2	1.070	473	462	80	18	2	0	1.074
B8528-3	320	262	82	0	16	2	1.069	337	261	76	1	23	0	1.075
B8934-4	309	239	75	2	18	5	1.067	309	229	74	1	24	1	1.067
B8943-4	295	207	70	0	30	0	1.066	315	220	70	0	29	1	1.074
B8972-1	273	137	51	0	47	2	1.073	263	125	47	0	53	0	1.075
B8822-9	359	242	68	0	30	2	1.060	339	212	63	0	37	0	1.066
R. Burbank	376	287	76	.1	22	1	1.071	406	292	61	11	21	7	1.079
Superior	321	278	87	0	12	1	1.070	324	289	88	1	11	0	1.071
Average	345	270					1.068	352	275					1.072

Planted: May 6, 1981

Fertilizer: 200 lbs/A 0-0-60 plowdown

500 lbs/A 20-10-10 planter + temik 3 lbs/A

200 lbs/A 45-0-0

ALABAMA

J.L. Turner and H. Bryce - Main Station
E.L. Carden, R.N. McDaniel and F.B. Selman - Gulf Coast Substation
F.E. Garrett (Retired) - Alabama State Department of Agriculture and Industries
M.H. Hollingsworth - North Alabama Horticulture Substation
J.T. Eason and M.E. Ruf - Sand Mountain Substation

Potato Variety Trials, Gulf Coast Substation Fairhope and Sand Mountain Substation Crossville, Alabama

Experimental Procedure. Seed potatoes were obtained from Frito-Lay Company (Baldwin County, Alabama); Rodney Schmidt, Saline Minnesota; Starks Farms in Wisconsin; and USDA, Beltsville, Maryland for the 1981 trials. Sixteen named varieties and 17 numbered selections were grown this year for yield data and specific gravity. Each entry was replicated four times in a randomized block design. One row plots were 25 feet by 38 inches at Fairhope and Crossville. Seedpieces were cut to approximately one and one-half ounces each and treated with Orthocide 10 Dust at the rate of 3/4 pounds to 100 pounds of cut seed. Seedpieces were stored at approximately 55°F for approximately 12-14 days and planted February 24 at Fairhope and March 9 at Crossville. Seedpieces were planted at Fairhope with a hand operated planter and at Crossville by hand. Seedpieces were spaced 12 inches in the drill. Plots were harvested June 2 at Fairhope and July 7 at Crossville.

Results. At Fairhope, Belchip from the USDA and Starks Farms produced the highest yields of total marketable and size A potatoes. Breeding lines B-8724-2 and Atlantic, FL 1221 and FL 1152 also produced excellent yields of total marketable and size A potatoes. Wisconsin 807-R produced the highest yield of the red skin entries. While Red La Soda did not yield among the top varieties this year, this variety remains the best red skin potato for the Baldwin County potato area. Wisconsin 748 and B-9127-17 were the lowest yielding entries. Percent of size A potatoes was very good for all entries. Specific gravity was highest for Wisconsin 760, 1.078. Atlantic, B-8615-2, Wisconsin 742 and Chipbelle also produced a high specific gravity. Specific gravity for Belchip was highest for the Starks Farms seed source.

At Crossville, weather conditions were favorable through mid-June this year. Excellent yields were obtained from most of the entries. Red La Soda from Rodney Schmidt Farm was the highest yielding entry. Frito-Lay 675, Atlantic, FL 1221 and Wisconsin 738 were the highest yielding white entries. Denali, Kennebec, Belchip and FL 1291 also produced good yields of total marketable and size A potatoes. Wisconsin 826 and 748 produced the lowest marketable yield. The precent yield of size A potatoes was excellent except for Wisconsin 797 and 826. Specific gravity was highest for Wisconsin 760, Atlantic and Denali. Wisconsin 716 had the highest stand count at harvest and Belchip and Wisconsin 748 had the lowest.

Alabama Table 1. Potato Variety Trial, Fairhope, 1981[1/]

Variety	Source	Marketable yield/acre					
		Total	Size A[2/]	Size B	Size A of total	Specific gravity[3/]	Stand at harvest
		Cwt.	Cwt.	Cwt.	%		%
Belchip	USDA	266	259	7	98	1.062	95
Belchip	Starks Farms	256	247	8	97	.066	87
B-8724-2	USDA	253	241	12	95	.066	90
Atlantic	Starks Farms	249	242	7	97	.075	90
FL 1221	Frito Lay	235	228	7	97	.070	88
FL 1152	Frito Lay	235	228	7	97	.061	90
Wis 797	U. Wisconsin, Rhinelander	221	213	8	97	.064	89
FL 795	Frito Lay	221	212	9	96	.066	88
FL 96	Frito Lay	213	207	6	97	.068	89
Wis 807-R	U. Wisconsin, Rhinelander	211	196	15	92	.056	88
FL 1291	Frito Lay	210	202	8	96	.066	89
Russet Sebago	Starks Farms	209	203	6	97	.059	88
Wis 760	U. Wisconsin, Rhinelander	205	197	8	96	.078	90
Wis 738	U. Wisconsin, Rhinelander	197	191	6	97	.070	86
B-8977-2.....	USDA	195	187	8	96	.074	86
Red La Soda	Rodney Schmidt, MN	191	185	6	97	.059	89
FL 162	Frito Lay	186	177	9	95	.065	89
Red La Soda	Starks Farms	186	177	9	96	.059	89
B-9127-6	USDA	183	180	3	98	.058	86
La Chipper	Starks Farms	183	175	8	96	.063	86
FL 657.....	Frito Lay	177	172	5	97	.059	89
Wis 795	U. Wisconsin, Rhinelander	169	161	8	95	.068	84
FL 1280	Frito Lay	161	152	9	93	.063	85
Chipbelle	USDA	160	151	9	94	.073	87
Wis 716	U. Wisconsin, Rhinelander	157	149	8	95	.061	88
Denali	Starks Farms	154	147	7	95	.070	83
B-8615-2	USDA	153	145	8	95	.075	87
Wis 723	U. Wisconsin, Rhinelander	149	140	9	94	.068	84
Wis 826	U. Wisconsin, Rhinelander	146	139	7	95	.072	92
Wis 742	U. Wisconsin, Rhinelander	144	138	6	96	.076	86
B-8710-16	USDA	142	137	5	96	.062	89
B-8798-20	USDA	141	138	3	98	.068	88
Superior	Starks Farms	140	133	7	94	.066	84
Wis 748	U. Wisconsin, Rhinelander	116	110	6	94	.069	85
B-9127-17	USDA	93	88	5	94	.063	90

Alabama Table 1. Continued

[1]Soil test: P = 100 (M); K = 110 (H); pH = 6.1.

[2]Size A = potatoes with 1-7/8 inches diameter and larger; Size B = potatoes with 1-1/2 to 1-7/8 inches diameter.

[3]Specific gravity was greater than 1.0 for each variety.

Alabama Table 2. Potato Variety Trial, Crossville, 1981[1/]

Variety	Source	Marketable yield/acre Total	Size A[2/]	Size B	Size A of total	Specific gravity[3/]	Stand at harvest
		Cwt.	Cwt.	Cwt.	%		%
Red La Soda	Rodney Schmidt, MN	317	301	16	95	1.062	85
Red La Soda	Starks Farms	289	277	12	96	.059	95
FL 657	Frito Lay	253	246	7	97	.059	90
Atlantic	Starks Farms	243	234	9	96	.082	85
FL 1221	Frito Lay	242	232	10	96	.070	90
Wis 738	U. Wisconsin, Rhinelander	238	229	9	96	.067	86
Denali	Starks Farms	226	217	9	96	.081	94
Kennebec	---------	225	219	6	97	.066	86
Belchip	Starks Farms	223	216	7	97	.068	83
FL 1291	Frito Lay	220	207	13	94	.069	88
FL 795	Frito Lay	211	205	6	97	.074	90
FL 96	Frito Lay	204	194	10	95	.064	84
Wis 807-R.....	U. Wisconsin, Rhinelander	201	184	17	92	.058	89
La Chipper	Starks Farms	200	188	12	94	.069	92
FL 162	Frito Lay	193	184	9	95	.064	89
Wis 760	U. Wisconsin, Rhinelander	193	184	9	95	.085	89
Wis 723	U. Wisconsin, Rhinelander	191	174	17	91	.070	95
Superior	Starks Farms	190	183	7	96	.068	89
Wis 742	U. Wisconsin, Rhinelander	186	178	8	96	.078	97
FL 1152	Frito Lay	180	170	10	94	.056	96
Wis 797	U. Wisconsin, Rhinelander	170	149	21	88	.072	91
Wis 716	U. Wisconsin, Rhinelander	161	150	11	93	.064	98
Wis 795	U. Wisconsin, Rhinelander	151	139	12	92	.073	93
FL 1280	Frito Lay	143	134	9	93	.067	84
Russet Sebago	Starks Farms	125	116	9	93	.054	69
Wis 826	U. Wisconsin, Rhinelander	117	104	13	89	.075	97
Wis 748	U. Wisconsin, Rhinelander	116	105	11	91	.070	83

[1]Soil test: P = 230 (VH); K = 180 (H); pH = 5.5.

[2]Size A = potatoes with 1-7/8 inches diameter and larger; Size B = potatoes with 1-1/2 to 1-7/8 inches diameter.

[3]Specific gravity was greater than 1.0 for each variety.

CALIFORNIA

R. E. Voss, P. W. Bosland

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Potato Seedling and Varietal Evaluation - 1981

The 1981 potato trials were conducted in the same manner as in 1980. First-year tubers, five-hill, 12-hill, and two replications of 20-hill were planted on February 26 on the USDA Cotton Research Station at Shafter in Kern County and on May 12 on the Tulelake Field Station at Tulelake in the "Klamath Basin." Additionally, four replications of 27 hills were planted at Riverside, Santa Maria, Shafter, Tulelake, Butte Valley, and Eureka. The Shafter and Tulelake data are summarized in Tables 1 and 2.

The first-year tubers were obtained from Drs. J. Pavek (Idaho) and R. Johansen (North Dakota). Dr. Pavek supplied 10,367 seedling tubers representing 43 families. Nine specific families were included in the Shafter trial only, and five specific families were included in the Tulelake trial only. The remaining 29 families were divided evenly between the two locations. Dr. Johansen supplied 10,220 seedling tubers representing 55 families. All North Dakota families were evenly divided between both locations. Evaluation of the 10,453 single hills at Shafter and 10,134 single hills at Tulelake was based on appearance. The numberof single hills selected for further evaluation which will be planted in five-hill plots in 1982 were 189 at Shafter and 291 at Tulelake. In the five-hill plot tests, 71 of 514 lines at Shafter, and 69 of 321 lines at Tulelake were retained for further evaluation in 12-hill plots. The 12-hill observational plots using the same selection criteria had 35 of 114 lines saved from Shafter, and 18 of 67 lines saved from Tulelake.

The two replications of 20-hill plots grown at Shafter and Tulelake were evaluated for yield, specific gravity, chip color, and general tuber rating. From Shafter, 36 clones were tested; and from Tulelake, 29 clones were tested. The summary of this data appears in Tables 3 and 4.

The replicated yield trials at Shafter had 50 lines, and Tulelake had 48 lines. They were evaluated for yield, specific gravity, chip color, and general tuber rating. All entries at Shafter were tested for susceptibility to black spot. These entries are listed in Tables 1 and 2.

CALIFORNIA TABLE 1. Yield and Quality Measurements of Replicated Yield Trial at Shafter, 1981.

Variety[1] or Selection #	Seed Source	Acre Yield (CWT/AC) Total	#1's >12oz	#1's 4-12oz	2's + Culls	B's	% #1's	Tuber Rating*	Spec. Grav. 1.0--	Sugar Level*	% Stand	Black Spot*	Notes[2]
RUSSET													
AD7267-1B	D11	540A[3]	60	480	5	35	93	3.3	65	.85	98	17	
A72685-2	Ore	475AB	75	400	15	20	93	3.0	85	1.10	81	29	HS
AD7267-1	Ore	465ABC	35	430	10	25	93	3.3	67	1.10	93	11	
LEMHI	Ore	440ABCD	45	395	10	20	94	3.0	79	.70	89	45	IB
A74133-1	D217	405ABCDE	20	385	10	15	94	3.0	79	.75	100	4	S, Open net
AD74135-1	Ore	395BCDE	30	365	25	30	88	3.2	76	1.10	98	11	
CENTENNIAL	D208	380BCDE	10	370	20	20	90	3.0	75	1.70	94	-0-	GC, slight /scab
BUTTE	D18	375BCDE	-0-	375	10	35	89	2.4	82	.85	90	27	
WD641-10	D236	355BCDE	55	300	15	15	92	3.6	80	1.00	90	5	
A74543-6	D58	345BCDE	35	310	5	15	95	3.1	84	1.10	94	8	
A72545-2	Ore	345BCDE	5	340	10	10	95	3.0	76	.60	65	6	
NDD392-9	D77	340BCDE	40	300	10	20	92	3.1	68	1.25	78	30	
NDD143-1A	D36	320CDEF	5	315	5	35	89	3.0	69	.85	100	28	
A70365-27	D6	315CDEF	45	270	20	20	89	3.1	91	1.20	87	21	HS
AD74103-3	D61	315DEF	25	290	20	15	90	2.8	80	.74	100	2	S, GC, BN
BC8524-3	D93	310DEF	30	280	10	40	86	2.9	72	1.45	97	3	
NOR. RUSSET "M"	D28	300DEF	-0-	300	-0-	20	94	3.0	72	1.20	92	2	
AD7267-1A	D10	295EF	30	265	10	35	87	3.1	66	.85	97	12	
AD7377-1	Ore	285EF	10	275	20	15	89	3.1	68	1.35	93	15	GC
R. BURBANK	Ore	285EF	10	275	35	25	83	2.8	84	.85	97	20	GC
ND274-6	D228	280EF	-0-	280	10	35	86	2.8	71	.60	94	10	ST
A74265-2	D218	210F	5	205	10	35	82	2.5	81	1.00	89	14	ST
A68599-1	D219	205E	5	200	10	15	89	3.0	79	.60	92	2	
CHIPPER													
ND9474-6A	D32	620A	80	540	20	20	94	3.3	66	1.10	87	12	slight SB,IB
BELCHIP	D17	565AB	60	505	10	10	97	3.0	82	.35	82	15	
CRYSTAL	D210	565AB	50	515	30	25	91	3.8	68	.35	99	21	IB
WC672-2	Ore	490ABC	55	435	5	10	97	3.3	81	.70	86	22	IB
ATLANTIC	D202	455BCD	70	385	10	20	94	3.6	87	.85	86	14	
ND337-4	D127	410CD	55	355	10	15	94	3.3	65	.60	86	6	
KENNEBEC	D26	400CD	55	345	30	10	91	3.1	78	.70	90	-0-	LT
ND258-1	D83	395CDE	30	365	10	20	93	3.5	79	.85	97	10	

CALIFORNIA TABLE 1. Yield and Quality Measurements of Replicated Yield Trial at Shafter, 1981 - Page 2

Variety or Selection #	Seed Source	Acre Yield (CWT/AC) Total	#1's 12oz	#1's 4-12oz	2's + Culls	B's	% #1's	Tuber Rating*	Spec. Grav. 1.0--	Sugar Level*	% Stand	Black Spot*	Notes
NDD277-2	D69	390CDE	45	345	80	5	82	3.1	73	.60	96	2	severe SB
AK28-8	D16	385CDE	25	360	25	25	89	3.1	73	.35	94	8	IB, slight SB
ND278-3	D85	375CDE	30	345	20	15	91	3.1	69	.60	98	-0-	IN, S
ND362-3	D234	370CDE	5	365	5	30	91	2.8	76	.45	88	14	VS
ND89-9	D81	335DEF	20	315	5	5	97	3.1	70	.85	94	3	S
NORCHIP	Ore	255EF	-0-	255	20	25	85	2.4	71	.70	93	2	S
BC9071-6	D95	255EF	15	240	5	20	91	3.3	78	.70	69	24	IB
DENALI	D24	240F	20	220	80	15	72	2.3	90	.35	92	83	severe SB
LONG WHITE													
AD74548-5	D222	335A	15	320	15	30	88	3.4	73	.70	80	4	VN, slight SB
AD7386-1	D206	260A	15	245	40	25	80	3.4	74	.85	87	16	S
W. ROSE	D216	230A	35	195	30	25	81	2.5	68	.70	85	-0-	K, VN, GC
RED													
CHIEFTAIN	D199	450	35	415	5	15	95	3.1	72	1.20	100	6	S
LSD			35	105	20	15							

1) Seed for all entries was from the California Stockton delta
2) See notes abbreviations below
3) Duncan's 5%, entries with common letters are not significantly different

NOTES: Abbreviations

S=skinned
HS=heat sprouting
GC=growth cracks
LT=large tuber
ST=small tuber
BN=bottle neck
SB=scab
IB=internal browning
VN=veinal necrosis
VS=tubers stick to vine
K=knobby
IS=irregular shape
IN=internal necrosis

* BLACK SPOT: 0-75
0=no darkening on 15 bruises
75=intense darkening on 15 bruises

* SUGAR LEVEL: maximum of approximately 1.2 acceptable for processing

* TUBER RATING: 1-5
1=very poor
2=poor
3=acceptable
4=good
5=excellent

CALIFORNIA TABLE 2. Yield and Quality Measurements of Replicated Yield Trial at Tulelake, 1981.

Variety or Selection #	Seed Source [1]	Acre Yield (CWT/AC) Total	#1's >12oz	#1's 4-12oz	2's + Culls	B's	% #1's	Spec. Grav. 1.0--	Sugar Level*	% Stand	Vine Vigor	Tuber Rating*	H.H.	Notes [2]
RUSSET														
A74133-1	Delta	445 [3]	155	290	60	25	84	94	.9	92	2.4	3.6	0/12	LT
AD74135-1	Ore	400	120	280	50	55	79	94	1.0	99	3.8	3.7	0/12	LT, Rot
AD7377-1	Ore	395	155	240	55	35	81	78	.9	85	2.7	3.5	0/12	
A66122-3	Delta	375	90	285	70	35	78	80	.9	91	2.8	3.8	4/12	K
BUTTE	Delta	355	75	280	45	70	76	89	1.6	84	3.7	3.6	0/12	
LEMHI	Ore	355	110	245	80	40	75	86	1.0	86	3.8	3.9	0/12	16/30 BS,GC
AD74135-1	Delta	340	80	260	55	50	76	88	.9	92	3.3	3.6	1/12	LT, GRN
AD7267-1	Delta	335	130	205	70	45	74	76	1.9	89	3.8	3.6	1/12	
R. BURBANK	Ore	335	70	265	95	70	67	94	.6	96	3.5	3.6	1/12	sl BS
A72545-2	Ore	325	105	220	65	35	77	91	1.4	85	2.7	3.1	5/9	
ND274-6	Delta	325	60	265	90	40	71	68	1.1	86	3.5	3.2	2/12	GC
AD7377-1	Delta	310	80	230	70	45	73	74	2.0	93	3.6	3.4	1/12	IS
A68599-1	Delta	300	70	230	60	30	77	85	1.0	89	2.3	3.4	0/12	LT
CENTENNIAL	Delta	300	75	225	45	25	81	80	1.4	87	2.5	3.2	5/12	
AD7267-3	Delta	295	45	250	75	65	68	90	1.4	90	4.0	3.2	1/12	Susc. to BS
BC8524-3	Delta	295	70	225	90	30	71	78	2.2	92	2.8	3.2	0/12	AH
R.BURBANK	Delta	290	50	240	75	50	70	86	.2	97	3.8	3.5	2/12	K
AD74103-3	Delta	270	100	170	215	30	52	87	1.2	94	3.1	2.7	0/12	K
NDD143-1A	Delta	260	50	210	80	35	69	78	.9	92	3.1	2.8	0/12	AH
A74265-2	Delta	260	115	145	115	45	62	101	.8	90	3.0	3.1	4/12	LT, K
AD7267-1	Ore	255	80	175	65	50	69	73	2.5	89	3.5	3.8	1/12	
A74543-6	Delta	235	120	115	95	30	65	103	.9	88	2.7	3.6	2/12	LT
A72685-2	Ore	230	45	185	50	35	73	94	3.0	86	4.0	3.1	3/12	IS,VD
WD641-10	Delta	225	95	130	30	20	82	84	.5	96	2.2	3.4	0/12	Rot, VD
HIGHLAT	Aka	150	20	130	65	25	63	67	.5	90	3.3	2.0	4/12	Rot, K
NDD392-9	Delta	70	10	60	285	40	18	74	.5	81	2.2	1.0	1/12	GC
LONG WHITES														
WHITE ROSE	Delta	320	100	220	185	30	60	76	1.8	94	3.7	2.3	1/12	Rot
AD74548-5	Delta	225	55	170	95	70	58	80	1.5	89	3.7	3.5	4/12	Rot, Grn
AD7386-1	Delta	175	45	130	120	45	51	81	1.9	90	3.0	3.1	3/12	Rot

CALIFORNIA TABLE 2. Yield and Quality Measurements of Replicated Yield Trial at Tulelake, 1982 - Page 2

Variety or Selection #	Seed Source [1]	Acre Yield (CWT/AC) Total	#1's >12oz	#1's 4-12oz	2's + Culls	B's	% #1's	Spec. Grav. 1.0--	Sugar Level*	% Stand	Vine Vigor	Tuber Rating*	H.H.	Notes [2]
CHIPPERS														
BELCHIP	Delta	570	140	430	60	15	88	102	1.2	88	3.5	3.4	7/12	LT
ATLANTIC	Delta	555	125	430	65	20	86	96	.5	89	4.0	4.1	7/12	
WC672-2	Ore	525	125	400	90	15	83	98	.6	90	4.0	4.0	4/12	GC
ND377-4	Delta	435	130	305	40	25	87	74	1.1	90	3.2	3.6	7/12	LT
BC9071-6	Delta	420	165	255	55	15	86	82	.7	82	2.8	3.8	3/12	LT
BC9020-7	Delta	395	65	330	90	35	76	83	.8	91	4.0	3.4	6/12	Pink Apical
ND258-1	Delta	390	105	285	75	45	77	80	.4	93	3.6	3.4	0/12	GRN
WC521-12	Colo	385	200	185	60	15	84	103	1.2	72	2.8	4.1	3/12	
ND362-3	Delta	375	70	305	60	55	82	84	3.6	93	4.0	3.6	1/12	GRN
ND9474-6A	Delta	370	130	240	25	25	88	72	1.6	86	3.6	3.9	11/13	Rot
KENNEBEC	Delta	345	165	180	200	20	61	82	1.1	92	3.5	3.0	4/15	GRN
ND278-3	Delta	330	80	250	40	15	85	79	1.0	94	4.2	3.1	7/12	Rot SB
ALASCLEAR	Aka	295	20	275	90	40	71	87	.8	87	4.0	3.0	6/12	Small, BS
CRYSTAL	Delta	305	105	200	85	25	73	75	.4	84	3.5	3.4	4/12	Rot, GRN
NORCHIP	Ida	265	15	250	80	25	72	82	.6	91	3.8	3.0	3/12	Small
NDD277-2	Delta	210	60	150	85	15	68	94	1.0	75	3.2	3.2	2/12	
ND89-9	Delta	150	70	80	55	15	68	62	2.2	92	3.8	3.0	3/12	Rot
REDS														
CHIEFTAIN	Delta	490	185	305	55	30	85	76	1.0	98	3.8	4.0	1/12	
RED LA SODA	Delta	385	95	290	145	25	69	77	1.5	95	4.0	2.8	10/12	Rough, GC
LSD 5%			55	70	45	20								

1) Seed for all entries was from the California Stockton delta.
2) See notes abbreviations on next page.
3) Duncan's 5%, entries with common lines are not significantly different.

* Sugar Level: Maximum of approximately 1.2 acceptable for processing.
* Tuber Rating: 1 = very poor; 2 = poor; 3 = acceptable; 4 = good; 5 = excellent.

CALIFORNIA TABLE 2. Yield and Quality Measurements of Replicated Yield Trial at Tulelake, 1982 - Page 3

Abbreviations to NOTES:

AL = alligator hide
BN = bottle neck
GC = growth cracks
GRN = green
HS = heat sprouting
IB = internal browning
IN = internal necrosis
IS = irregular shape
K = knobby
LT = large tuber
NEM = nematodes
S = skinned
SB = scab
ST = small tuber
VD = veinal discoloration
VN = veinal necrosis
VS = tubers stick to vine

CALIFORNIA TABLE 3. Yield and Quality Measurements of 2 X 20 Hill Trial at Shafter, 1981.

Variety[1] or Selection #	Acre Yield (CWT/AC) Total	# 1's >12oz	# 1's 4-12oz	2's + Culls	B's	% #1's	Tuber Rating	Spec. Grav. 1.0--	Sugar Level	% Stand	Notes[2]
RUSSETS											
AD 74458-5	335A[3]	25	310	10	15	93	3	72	1.5	100	
ND 388-1 Rus	295AB	30	265	5	10	95	3	77	1.2	93	
A 7596-1	240AB	0	240	25	10	87	2.5	79	1.2	90	
ND 450-9 Rus	240AB	0	240	10	15	91	3	62	1.2	100	VN
ND 443-4 Rus	230AB	5	225	0	10	96	3.3	75	1.0	95	
LEMHI	230AB	30	200	5	10	94	3	85	.7	75	poor std., VN
AD 7430-2	230AB	5	225	0	15	94	3	77	.7	90	
A 7411-2	215AB	0	215	45	10	80	2.5	80	1.2	100	K
AD 75180-1	215 B	0	215	40	10	81	2.5	81	.7	98	K, HS, VN, ST
NDD 739-1	210 B	30	180	25	10	86	2.5	68	.5	93	HS, Rot
ND 537-4	200 B	0	200	20	15	85	3	69	1.0	98	GC
NC 537-2 Rus	195 B	10	185	10	15	89	3	72	1.2	98	Rot
Centennial	190 B	0	190	10	15	88	3	78	1.2	85	VN
ND 451-2	190 B	10	180	10	5	93	3	78	1.0	98	
ND 534-4	145 B	0	145	0	20	88	3	78	1.0	98	
ND 452-1	135 B	0	135	5	15	87	3	71	1.5	75	
CHIPPERS											
Kennebec	480A	120	360	35	10	91	3.3	73	.7	98	VN
ND 435-12	400AB	0	400	40	10	89	3.3	65	.7	100	SB, IN, Uniform
ND 258-1	355ABC	35	320	12	20	92	3	85	.5	98	VN
ND 9750-3	310ABC	0	310	5	15	94	3	75	1.0	88	
ND 435-9	280 BC	0	280	35	5	88	3	74	.7	100	Rot, GC
Denali	265 BC	0	265	35	20	83	3	90	.7	98	SB
ND 9750-4	230 BC	5	225	5	10	94	3	70	1.0	88	VN, slight SB
ND 194-1	195 C	5	190	5	5	95	3	74	.5	70	poor stand, VN
AD 711028-3	195 C	10	185	25	15	83	3	78	.7	85	VN, slight SB, IS
LONG WHITES											
AD 7508-1	415A	20	395	20	35	88	3	87	.5	100	IS
White Rose	295A	0	295	60	10	81	2.3	66	1.2	100	K
ND 227-1	280A	5	275	15	35	85	3	76	.5	90	VN

CALIFORNIA TABLE 3. Yield and Quality Measurements of 2 X 20 Hill Trial at Shafter, 1981 - Page 2

Variety[1] or Selection #	Acre Yield (CWT/AC)					% #1's	Tuber Rating	Spec. Grav. 1.0--	Sugar Level	% Stand	Notes[2]
	# 1's			2's +							
	Total	>12oz	4-12oz	Culls	B's						
REDS											
Chieftain	425AB	10	415	5	15	96	3	70	.7	99	
Red La Soda	405AB	50	355	5	5	98	3	70	1.2	95	IB, VN
ND 24-1R	305 BC	15	290	35	15	86	3	75	1.0	95	
ND 9403-16R	195 C	0	195	10	15	89	3	70	.7	98	
LSD		35	150	NS	10						

1) Seed for all entries was from the California Stockton delta
2) See notes abbreviations at end of replicated yield trial table
3) Duncan's 5%, entries with common letters are not significantly different

CALIFORNIA TABLE 4. Yield and Quality Measurements of 2 X 20 Hill Trial at Tulelake, 1981.

Variety or Selection #	Seed Source [1]	Acre Yield (CWT/AC) Total	#1's >12oz	#1's 4-12oz	2's + Culls	B's	% #1's	Spec. Grav. 1.0--	Sugar Level*	% Stand	Vine Vigor	Tuber Rating*	H.H.	Notes [2]
RUSSET														
AD75193-2	Delta	540	175	365	60	60	82	87	1.3	98	3.0	3.8	0/6	
LEMHI		400	55	345	85	70	72	93	1.3	70	3.0	3.8	1/6	
NDD440-9		380	55	325	45	95	73	89	1.3	78	3.5	3.8	0/6	
ND534-4 rus		380	95	285	20	25	89	75	1.5	95	3.0	3.5	0/6	Deep Eye
NDD666-2 rus		320	20	300	35	90	72	71	1.6	93	3.0	3.3	0/6	VD
AD7578-1		315	15	300	45	60	75	83	1.5	75	3.0	2.5	0/6	IS
ND535-7 rus		305	90	215	20	30	86	74	1.6	93	2.0	4.0	0/6	LT
AD7425-1		295	15	280	90	145	56	89	1.5	83	3.0	3.5	3/6	
CENTENNIAL		285	55	230	35	40	79	78	1.6	75	2.5	3.5	0/6	
R. BURBANK		270	60	210	115	60	61	93	1.5	85	4.0	3.5	2/6	K
ND548-4 rus		260	70	190	20	25	85	67	2.5	98	2.0	3.8	0/6	
AD74392-4		235	30	205	35	45	75	79	2.0	55	2.0	3.5	1/6	
AD71992-7		225	25	200	40	30	76	87	.5	88	2.5	3.0	0/6	
ND537-2 rus		220	15	205	25	90	66	70	2.6	78	2.0	3.3	0/6	
AD71992-8		190	20	170	60	55	62	82	1.1	88	2.0	2.8	1/6	
NDD450-6		165	30	135	15	30	79	70	2.3	90	3.0	3.0	2/6	Rot
NDD712-2		105	0	105	25	155	37	93	.8	93	2.0	3.5	2/6	K
CHIPPERS														
ND413-4	Delta	565	15	550	40	85	82	87	.5	83	4.0	3.3	0/6	
ND435-9		555	135	420	20	40	90	77	1.5	85	3.5	4.0	4/6	
ND377-5		520	80	440	30	30	90	98	.6	88	2.0	4.0	0/6	
DENALI		520	75	445	35	30	89	101	.5	100	3.5	3.8	0/6	Rot
ND129-6		500	10	490	20	100	81	85	.5	95	4.0	3.5	0/6	Small
KENNEBEC		410	160	250	140	15	73	85	1.5	95	3.5	3.0	1/3	LT
AD68678-4		395	90	305	50	45	81	82	1.5	85	2.5	3.5	0/3	Rot
ND9750-3		200	50	150	70	30	67	73	2.5	85	2	3.5	1/6	VD
ND227-1		175	15	160	65	50	60	87	1.2	83	4	2.8	1/6	GRN, Rot
LSD 5%		180	65	155	55	35								

COLORADO

D. G. Holm, J. A. Twomey and M. Workman

Potato Seedling and Varietal Evaluation

Seedling Program. Twenty-seven parental clones were selected for crossing in 1981 and seeds from 124 crosses were obtained. Seventy seedling families were grown in the greenhouse, producing approximately 7500 tubers for initial selection in 1982. Surplus tubers are being distributed to other programs.

Seedlings were received from Dr. Raymon Webb, Beltsville, Maryland; Dr. J. J. Pavek, Aberdeen, Idaho; and Dr. Creighton Miller, College Station, Texas. A total of 40,000 first-year seedlings were planted and included 8,000 from our breeding program which was started in 1979.

Approximately 250 first-year seedlings were selected in 1981 for further observation. Thirty-two advanced seedlings are being increased and evaluated. Two processing lines, WC672-2 and WC521-12, are being tested extensively in other States. Clone AC67560-1 is being released as the variety Sangre. Line AC77182-1 has shown promise as a chipping potato and will be increased in 1982.

Nitrogen-Use Efficiency of Potato Clones. A preliminary field study was conducted in 1979 to evaluate the nitrogen-use efficiency (NUE) of 23 potato clones. Based on the preliminary study, 10 clones were selected on the basis of differing NUE for further evaluation in 1980 and 1981.

The clones were grown under two soil fertility regimes in each year - low nitrogen and high nitrogen. In 1979, nitrogen and phosphorus were applied at the rates of 92 and 45 pounds per acre, respectively, for the high-nitrogen regime. The low-nitrogen regime did not receive any fertilizer. The high soil-nitrogen-fertility regime in 1980 and 1981 received nitrogen and phosphorus at the rates of 140 and 44 pounds per acre, respectively. The low-nitrogen regime received only phosphorus.

Three criteria were used to assess nitrogen-use efficiency: (1) Total yield under low soil nitrogen conditions; (2) ability to produce greater total yields when additional nitrogen is supplied; and (3) tuber nitrogen recovery. Nitrogen recovery is measured by the percent increase in nitrogen in the tubers in the high-nitrogen regime compared to the low-nitrogen regime divided by the amount of nitrogen applied.

Colorado Table 1 summarizes the information on the three criteria used to assess NUE for the 10 clones evaluated. Clones differed considerably in yield under low soil-nitrogen levels, yield response to applied nitrogen, and tuber nitrogen recovery. None of the named cultivars were considered to have a low yield potential under low nitrogen conditions.

These results indicate that considerable variability for nitrogen-use efficiency exists in adapted potato clones. This indicates that it may be possible to develop potato cultivars that more efficiently utilize available mineral nutrients.

Colorado Table 1. Yield under low soil-nitrogen conditions, response to applied nitrogen, and nitrogen recovery by tubers of 10 potato clones averaged over a 3-year period (1979-1981).

Clone	Total Yield	Response	N Recovery
	Cwt/A		%
A6680-5	222	15	7.1
BC8370-4	258	32	18.0
WC523-8	190	61	30.2
WC567-1	360	29	13.7
WC618-9	221	65	28.8
WC672-9	323	31	22.0
Atlantic	324	35	16.5
Lemhi Russet	337	51	30.5
Nooksack	276	78	37.1
Russet Burbank	322	65	36.5
Mean ($\bar{x}$)	283	46	24.0
95% C.I.	$\bar{x}$±42	$\bar{x}$±15	$\bar{x}$±7.2

FLORIDA

J. R. Shumaker, D. P. Weingartner, J. Watts, and R. E. Webb

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for their adaptability and desirable horticultural characteristics at the Agricultural Research Center, Hastings, Florida. Clones were grown in either advanced (four replications) or intermediate (two replications) trials. Seed was spaced 12 inches apart in 20 foot single row plots. Between row spacing was 40 inches. The crop was planted on January 30 and February 2 and was harvested May 18-20. Commercial cultural practices were used in all tests. Yield of tubers, their appearance and specific gravity were taken at harvest. Tuber samples were shipped to Berwick, PA, for chip color evaluation. The tests were grown under near excellent conditions.

Advanced Yield and Quality Tests (Round White Clones, Florida Table 1). Atlantic, standard chip processing variety grown in Florida, was superior to other clones in combining high tuber yields and specific gravities with desirable tuber types and chip color ratings. Late Superior, a strain of Superior which was selected in Nebraska, significantly produced greater yields than the standard strain. Late Superior with its highly desirable yields, tuber appearance and processing qualities may provide area growers with a promising new variety for both the table and processing markets.

Intermediate Yield and Quality Tests (Round White Clones, Florida Table 2). Clones which compared favorably with one of the standard varieties, Atlantic, Sebago, or Superior, will be tested further in 1982.

Advanced and Intermediate Russet Tests (Florida Table 3 and 4). Centennial and several seedlings produced exceptionally good tuber yields (Table 3) which were significantly higher than those obtained from BelRus, standard, long russet type in the area. Of these, B8972-1 was considered the most promising clone tested in 1981. It combined moderate to high tuber yield and specific gravity with an excellent long russet type.

Advanced Red Test (Florida Table 5). Red La Soda (north Florida's standard red variety) was superior to other clones tested in tuber yield production. However, Wis 806R and 774R produced tubers of more desirable appearance.

Florida Table 1. Results from 48 clones selected for advanced testing at Hastings, Florida -- 1981.

Variety	Yield (cwt/acre)		Tuber appear-ance[1]	Specific gravity	Chip Color[2] Weeks after harvest					
	US#1A	Total			1	2	3	4	5	Average
Crystal	439	496	5.5	1.072	2	3	5	5	5	4.0
Wis 710	434	459	8.3	1.061	4	2	3	3	3	3.0
B8724-2	397	444	5.5	1.077	3	3	4	3	3	3.2
Atlantic (USDA)	388	425	6.5	1.086	3	2	3	5	2	3.0
B9335-17	386	422	8.0	1.069	4	3	3	6	6	4.4
Pungo	376	400	4.5	1.070	3	3	4	3	5	3.6
Wis 738	372	412	6.0	1.074	3	2	2	2	3	2.4
B8091-8	369	388	7.0	1.079	2	2	2	3	2	2.2
Late Superior	363	384	6.8	1.074	3	2	2	4	2	2.6
La Chipper	358	386	4.8	1.075	2	3	4	4	5	3.6
Belchip	356	372	5.0	1.075	2	1	2	2	2	1.8
PA 9LV-2	349	380	7.0	1.071	3	2	2	2	4	2.6
Sebago	348	387	7.0	1.064	3	3	5	3	2	3.2
B8710-16	348	402	8.0	1.075	4	5	5	5	5	4.8
Atlantic (ME)	345	376	7.3	1.084	4	4	3	4	2	3.4
B9127-6	340	359	6.8	1.067	3	2	2	3	2	2.4
B9127-17	338	363	7.8	1.077	4	5	6	6	6	5.4
B9384-6	338	391	6.0	1.071	3	3	4	3	3	3.2
B9140-4	336	370	7.0	1.081	5	1	4	2	2	2.8
B9144-5	333	363	7.0	1.074	2	3	2	3	2	2.4
Wis 718	330	353	6.0	1.072	3	1	1	2	2	1.8
PA II-1	326	343	7.3	1.075	2	1	1	2	1	1.4
New Manona	323	352	4.5	1.068	3	3	2	3	3	2.8
New Norchip	321	350	3.0	1.078	3	2	4	3	3	3.0
B9335-34	318	337	7.3	1.073	2	1	2	3	3	2.2
New Haig	317	357	6.0	1.073	3	2	3	5	2	3.0
B9335-49	316	367	8.0	1.063	4	4	5	7	6	5.2
B8798-20	304	315	8.0	1.081	3	1	3	2	3	2.4
B9127-1	298	312	8.0	1.064	4	6	6	8	8	6.4
B9137-9	295	392	6.5	1.066	4	3	1	4	2	2.8
B8799-13	294	319	5.8	1.087	3	2	4	4	2	3.0
B9140-6	291	349	5.0	1.077	4	3	4	3	4	3.6
B6987-184	289	322	5.5	1.082	3	3	5	5	2	3.6
B8907-4	287	306	7.8	1.070	2	3	3	2	4	2.8
B9258-2	283	344	7.0	1.076	3	3	3	6	3	3.6
Norchip	283	312	5.3	1.081	3	2	3	4	2	2.8
Superior	280	301	7.3	1.078	3	3	4	3	2	3.0
B9344-5	280	303	7.0	1.080	3	3	2	2	2	2.4
A7172-1	274	323	2.8	1.070	5	5	5	4	3	4.4
B9257-13	273	291	4.5	1.085	2	2	2	2	2	2.0
PAP0021-4	269	278	5.0	1.075	2	1	2	2	2	1.8
B9018-12	252	269	6.5	1.079	2	2	3	4	2	2.6
B9335-35	250	265	8.0	1.085	2	2	2	3	3	2.4

Florida Table 1. (Continued)

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance	Specific gravity	Chip Color Weeks after harvest 1	2	3	4	5	Average
B6969-2	245	268	7.8	1.068	5	3	4	5	3	4.0
B9130-24	242	259	7.5	1.074	4	3	4	5	3	3.8
B9335-7	234	250	7.8	1.072	3	3	5	4	3	3.6
B8599-42	226	239	7.3	1.074	2	2	2	2	2	2.0
B8799-8	211	233	8.5	1.085	3	2	2	2	2	2.2
LSD (0.05)	46	43	1.4	0.004						
(0.01)	60	57	1.8	0.006						

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

2/ Chip color: 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

Florida Table 2. Results from 96 clones selected for intermediate testing at Hastings, Florida -- 1981.

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance[1]/	Specific gravity	Chip Color[2]/ Weeks after harvest 1	2	3	4	5	Average
Sebago	401	446	6.0							
B9507-16	389	459	6.5	1.068	3	4	4	4	4	3.8
B9536-8	377	395	7.5	1.073	2	1	2	2	1	1.6
B9507-11	371	436	7.5	1.067	3	4	2	2	2	2.6
B8702-18	367	399	8.0	1.076	2	1	1	2	2	1.6
B8702-35	363	399	4.5	1.060	3	1	2	1	1	1.6
B8742-4	359	404	6.0	1.070	3	1	2	2	3	2.2
B8701-10	348	361	6.0							
B8742-3	346	382	7.0	1.067	2	1	2	2	2	1.8
Sebago	340	391	7.0	1.070	3	3	3	4	3	3.2
B9524-8	338	368	7.5	1.073	3	4	5	6	4	4.4
B8742-17	334	393	6.0							
B8706-20	334	366	5.5	1.074	2	2	5	2	3	2.8
B8706-8	333	357	6.0	1.073	2	2	2	2	2	2.0
B9550-9	324	375	6.0							
B9507-1	315	393	7.5	1.068	3	3	2	5	3	3.2
B8706-10	312	348	7.0	1.078	3	2	3	3	4	3.0
B9071-7	308	349	6.5							
Atlantic	305	386	6.5	1.081	3	3	2	2	2	2.4
B9530-7	304	337	7.0	1.074	3	1	2	2	2	2.0
B8706-6	304	336	6.0							
B9507-12	297	390	7.0	1.074	2	3	3	2	2	2.4

Florida Table 2. (Continued)

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance	Specific gravity	Chip Color Weeks after harvest 1	2	3	4	5	Average
B8701-12	295	331	5.5							
B9580-6	291	353	5.5	1.074	3	2	2	5	5	3.4
B9523-18	287	377	5.0							
PA P0035-1	287	317	4.0	1.070	3	2	3	3	6	3.4
B8742-10	276	294	6.0							
B8706-1	275	293	7.5							
B9621-22	271	330	7.5							
Wis 706	270	337	6.5	1.085	3	2	2	2	2	2.2
B9510-19	270	321	8.0	1.070	5	2	3	2	2	2.8
B8742-15	269	312	6.0							
B8702-31	269	299	6.0							
B9621-5	268	337	4.0							
B9572-5	268	299	6.5	1.085	3	2	2	2	3	2.4
B9071-8	267	302	6.5							
B9514-12	264	318	4.5							
B9473-2	261	313	7.5	1.061	4	3	2	2	5	3.2
B9524-7	256	282	5.5							
B8702-15	255	309	6.0							
B9621-17	255	294	6.0	1.076	4	3	4	2	3	3.2
B9525-18	255	285	7.0	1.074	3	3	2	2	3	2.6
B9071-3	254	317	6.0							
B9539-9LW	253	292	5.0							
B9514-38	250	282	7.5	1.074	4	1	2	2	2	2.2
Wis 815	248	312	6.5							
B8706-14	238	263	5.5	1.076	3	1	1	2	2	1.8
B6969-2	235	298	8.0	1.066	5	4	5	4	4	4.4
PA 9LE-3	231	262	7.0	1.070	4	5	5	7	6	5.4
B9581-10	223	302	6.5							
B9541-27	219	233	8.0	1.076	2	1	1	1	4	1.8
B9566-11	218	278	6.5	1.071	4	2	5	2	3	3.2
B9537-24LW	216	286	4.0							
B9550-23	212	285	4.0							
B9601-5	211	292	5.0							
B9523-12	210	314	3.5	1.063	5	5	3	7	5	5.0
B9510-17	206	302	5.5	1.089	3	3	2	3	2	2.6
PA 9AM-3	205	268	8.0	1.067	4	2	3	1	2	2.4
B9511-1	203	240	5.0							
B8702-14	203	231	4.5							
B9552-13Y	201	329	5.0							
B9580-3	199	265	6.0							
Superior	197	240	6.0	1.080	4	2	2	3	2	2.6
B9541-45	197	212	8.5	1.076	2	1	2	2	1	1.6
B9567-3	195	284	4.5							
B9619-9	194	275	8.0							
B9507-3	193	268	7.5							
B9581-9	190	233	6.5							
Wis 716	189	236	6.0							

Florida Table 2. (Continued)

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance	Specific gravity	Chip Color Weeks after harvest 1	2	3	4	5	Average
B9555-21	187	231	6.5							
PA 9BJ-2	185	215	6.0	1.075	3	2	3	6	4	3.6
B9581-1	182	283	5.5							
B8706-7	182	220	5.5							
Wis 703	175	217	6.5							
B9541-5	172	208	6.5							
B9536-34	167	200	5.5							
B9552-43	165	240	6.0							
B9541-20	165	183	8.0	1.073	3	1	2	2	2	2.0
B9536-23	161	214	5.0							
B9541-9	157	190	7.5	1.081	2	1	2	1	2	1.6
B9581-3	153	188	6.0							
B9581-5	150	218	5.5							
B9511-5	148	169	7.0	1.074	2	1	2	1	1	1.4
B9602-12	140	182	7.5							
B9541-44	137	171	7.0							
Wis 756	135	181	5.5							
Wis 752	133	212	5.5							
B9531-8	133	171	4.5							
B8706-15	124	164	6.0							
Wis 795	123	166	7.0							
B9520-5	113	172	5.5							
B9654-7	110	191	3.5							
PA 9HB-2	108	162	5.5							
B9582-18	93	126	5.5							
B9602-1	73	125	6.0							
B9582-17	54	133	7.0							

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

2/ Chip color: 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

Florida Table 3. Results from 18 russet clones selected for advanced testings at Hastings, Florida -- 1981.

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance[1/]	Specific gravity
Centennial	353	390	6.8	1.065
B8934-4	350	397	5.5	1.068
Wis 779	345	391	4.5	1.066
Centennial	337	372	8.0	1.068
Wis 780	335	367	5.3	1.072
B7583-6	333	405	7.7	1.073
B9147-3	329	372	5.5	1.064
Norgold 10-7	287	328	5.5	1.065
Butte	271	337	5.0	1.075
B9142-4	240	379	6.3	1.066
Norgold 35	238	282	5.3	1.064
B8972-1	229	301	8.3	1.073
Norgold USDA	201	241	5.5	1.072
B9221-14	178	233	4.3	1.069
B8833-6	176	206	8.5	1.075
Russet Burbank	164	263	2.8	1.070
BelRus USDA	149	184	8.0	1.076
BelRus Maine	142	184	8.0	1.075
LSD (0.05)	57	52	1.4	0.005
(0.01)	77	69	1.9	0.006

[1/] From 9.0 = most desirable to 0.0 = completely undesirable.

Florida Table 4. Results from 70 russet clones selected for intermediate testings at Hastings, Florida -- 1981

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appear-ance[1/]
B9540-62	408	446	8.5
B9648-15	387	425	6.5
B9553-6	373	430	6.0
B9540-29	358	374	7.0
B9648-9	348	382	6.0
B9539-14	344	401	4.5
B9540-5	344	368	6.0
B9545-25	321	415	6.0
B9538-6	304	329	8.5
B9606-12	301	347	8.0
B9635-12	295	357	5.0
Centennial	291	344	7.7

Florida Table 4. (Continued)

Variety	Yield (cwt/acre) US#1A	Yield (cwt/acre) Total	Tuber appearance
B9540-16	290	361	8.0
B9540-2	289	440	5.0
B9539-18	282	359	8.0
B9616-3	282	314	6.5
B9538-9	281	301	6.0
B9540-14	278	338	7.0
B9589-26	278	293	5.5
B9540-22	277	402	5.5
B9545-42	274	338	6.5
B9636-19	274	325	5.0
B9592-5	274	312	4.5
B9540-47	272	338	5.5
B9598-3	270	329	4.5
B9545-12	267	305	4.5
B9539-7	265	350	7.5
B9540-55	265	304	5.5
B9540-33	259	313	4.5
B9539-1	259	279	9.0
B9545-34	257	332	6.5
B9539-21	255	333	5.0
B9598-5	255	318	6.5
B9540-24	249	304	7.5
B9540-25	246	289	7.5
B9540-27	246	278	7.0
B9539-4	240	305	5.5
B9539-6	238	297	8.0
B9566-1	236	387	5.0
B9552-32	234	278	4.5
B9523-10	233	270	8.0
B9540-50	232	321	6.5
B9569-2	224	265	6.5
B9635-13	218	400	5.5
B9540-53	215	262	8.0
B9606-10	207	267	5.0
B9523-5	205	333	4.0
B9537-23	205	255	5.5
B9599-5	203	240	7.5
B9540-20	191	314	5.0
B9523-15	191	297	4.5
B9604-4	190	254	4.5
B9539-5	188	287	5.5
B9545-40	184	254	5.0
B9604-7	179	235	6.0
B9540-43	176	208	8.5
B9523-6	174	222	7.5
B9606-9	173	189	8.0
B9596-4	165	204	5.5
B9540-7	150	372	3.5
B9538-3	150	257	5.5

Florida Table 4. (Continued)

Variety	Yield (cwt/acre)		Tuber appear-ance
	US#1A	Total	
B9585-4	150	212	6.0
B9537-14	144	246	5.5
BelRus	143	171	8.0
B9596-2	139	212	4.5
B9540-23	138	210	6.5
B9537-17	128	185	6.5
B9539-8	124	248	4.5
B9544-9	116	199	5.0
B9537-4	66	240	5.0

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

Florida Table 5. Results from 9 red clones selected for advanced testings at Hastings, Florida -- 1981.

Variety	Yield (cwt/acre)		Tuber appear-ance 1/
	US#1A	Total	
Red La Soda	472	519	5.3
Wis 807R	407	434	5.3
Wis 806R	399	434	7.3
Wis 774R	393	416	7.7
Red New Norland #13	328	361	6.7
New Norland #6	290	340	6.7
Botouche Red	281	292	5.7
NB234 Red	248	268	5.7
8767-10R	242	278	6.3
LSD (0.05)	72	71	1.4
(0.01)	99	97	NS

1/ From 9.0 = most desirable to 0.0 = completely undesirable.

IDAHO AND EASTERN OREGON

J. J. Pavek, D. Corsini, C. Stanger, and S. Michener

Crossing and early generations (Aberdeen). Eighty tetraploid and 24 diploid cultivated, parental clones and three wild diploids were crossed in 1169 combinations. The crosses were designed to produce enhanced germplasm as well as varieties for processing and fresh market. Tubers of about 60,000 seedlings were produced of 337 families in greenhouses and screenhouses. Five hundred thirty-two clones were selected from 2137 12-hill plots; after storage and quality testing about 100 of these will be selected for further field testing. One hundred fifty-two clones were tested in preliminary and intermediate yield and disease trials; storage and quality evaluations are now being run.

Thirty-eight selected clones were introduced to the Tetonia seed farm via tuber index and stem cutting.

Advanced yield trials. The late harvest trial was conducted at three locations; the results are shown in ID-OR Table 1. Weather related stresses adversely affected the results at Kimberly and Malheur Co. Three Russet Burbank protoplast-derived clones were included in this trial along with seven other experimental clones. The most promising clones in this trial are A7411-2, A74595-11 (one-fourth S. andigena with S. andigena cytoplasm), and A75188-3.

The early harvest trial results are presented in ID-OR Table 2. Considerable water rot occurred at the Malheur location and therefore yields are not shown. Clone A74114-4 appears most promising; it stores well.

Descriptive information, certain disease reactions, and blackspot data are presented in ID-OR Table 3. Clone A7411-2 has the best Verticillium wilt reaction relative to its maturity, but it has the highest scab susceptibility. The three protoplast-derived clones and A7419-2 can have a problem with dry rot. Lemhi Russet continues to have a blackspot problem in commercial production and the score in the table is in agreement.

Other studies. The uniform national biomass trial was conducted at Aberdeen as was the national chipping trial; the results will be presented elsewhere.

Distribution. The distribution of breeding selections, named varieties, seedling tubers, and true seed during 1981 is summarized in ID-OR Table 4.

ID-OR Table 1. 1981 Advanced Late harvest yield trial, tuber yields, specific gravity, and french fry color.

Entry	Aberdeen, ID					Kimberly, ID					Malheur Co., OR				
	Total Yield cwt/A	U.S. #1's Tot %	U.S. #1's >10 oz %	Spec. Grav.	Fry Color	Total Yield cwt/A	U.S. #1's Tot %	U.S. #1's >10 oz %	Spec. Grav.	Fry Color	Total Yield cwt/A	U.S. #1's Tot %	U.S. #1's >10 oz %	Spec. Grav.	Fry Color
A66102-16	354	69	24	1.082	1.3	448	80	52	1.086	2.2	303	71	13	1.107	0.8
A7411-2	501	83	51	84	1.2	520	84	60	91	1.5	273	78	23	101	0.8
A7419-2	382	85	46	78	1.0	410	74	53	77	2.1	323	80	35	94	0.6
A74595-11	431	75	19	91	1.0	-	-	-	-	-	-	-	-	-	-
A7578-1	323	66	20	79	2.1	440	73	42	83	1.8	260	67	14	104	0.8
A75188-3	473	84	35	80	2.6	454	76	61	75	1.9	237	77	14	89	2.4
78-LC1	405	81	24	72	2.9	412	80	21	77	2.5	-	-	-	-	-
RB-SM2-50st	371	57	11	71	1.5	473	62	26	75	1.4	316	57	8	84	0.9
RB-SM8-50st	379	54	5	71	1.5	451	57	20	77	1.8	165	56	8	84	0.8
RB-SM122	271	18	0	78	0.9	303	45	8	82	1.6	245	22	0	91	0.7
Lemhi R.	409	65	22	84	0.9	551	85	61	88	0.8	322	65	12	103	0.5
Russet B.	317	60	15	73	1.7	452	65	38	79	1.6	316	72	25	87	0.9
LSD %	66			.003	0.6	110			.004	0.7	57			.005	0.8

Specific gravity: Air and water weight method.

French Fry Color: 0.5 (lightest) to 4.0 (darkest), after 3 months' storage at 45° F.

ID-OR Table 2. 1981 Advanced early harvest yield trial.

	Aberdeen, ID							Malheur Co., OR	
		U.S. No. 1			Culls				
	Total Yield cwt/A	Total %	>10 oz %	>6 oz %	<4 oz %	>4 oz %	Spec. Grav.	Fry Color	Spec. Grav.	Fry Color
A74114-4	266	77	22	61	17	6	1.074	1.3	1.090	0.7
NDA8694-3	279	69	12	44	19	11	70	0.5	81	0.5
78-LC1	269	72	9	42	25	3	74	1.0	85	0.7
Lemhi Rus.	282	78	17	54	15	8	79	0.9	92	0.6
Norgold Rus.	286	77	15	53	22	2	66	1.5	82	1.9
Pioneer	314	77	16	55	20	3	76	0.7	-	-
Russet B.	251	55	8	31	22	23	70	1.2	90	0.7
LSD 5%	53						.003	0.5	.005	0.7

French Fried 5 to 7 days after harvest.

ID-OR Table 3. Advanced selections, vine, tuber, disease characteristics.[1/]

Entry	Tuber		Field (0-9)					Strg(0-5)	
			Vine		Vert	Erly		Dry	Blk
	Rus	Shape	Size	Mat	wilt	Blt	Scab	Rot	Spot
A66102-16	Lt	O	7	7	5	4	1	4	2.1
A7411-2	M	L	7	6	4	4	5	4	2.0
A7419-2	Buff	O	7	8	4	2	1	5	1.5
A74114-4	M-	O-L	5	4	8	7	2	2	-
A74595-11	M.Hv	L-O	6	5	5	5	0	3	-
A7578-1	M+	O	6	7	6	4	0	3	1.6
A75188-3	M	O	7	8	3	4	0	4	0.7
78-LC1	M	O-L	5	4	9	9	1	3	1.6
RB-SM2-50st	M	L	6	6	7	6	1	5	1.5
RB-SM8-50st	M	L	6	5	8	7	1	5	1.8
RB-SM122	M	L	6	6	5	5	0	5	1.5
Lemhi R.	M+	L-O	6	6	7	6	0	3	3.4
Russet B.	M	L	6	6	7	7	1	4	2.0

[1/] Tuber: Rus = russeting; Lt = light, M = medium, Hv = heavy, Buff = non-russet.

Shape: O = oblong, L = long, O-L = oblong-long.

Field: 0 (minimum, earliest) to 9 (maximum, latest); 0 (minimum) to 5 (maximum).

Strg = Storage

ID-OR Table 4. Distribution of clones, seedlings, and seeds - 1981.

LOCATION	COOPERATOR	NUMBER
Clones:		
Alberta	D. Lynch	20
Argentina	H. Brücher	10
California	W. Ganey	1
	D. Kenfield	2
	J. McCoon	1
	J. Sowokinos	1
	H. Timm	2
	R. Voss	41
Colorado	D. Holm	1
	J. Twomey	1
	C. Urano	3
Florida	J. Shumaker	1
Idaho	F. Amar	2
	J. Davis	5
	E. C. Dallimore	16
	R. Dwelle	4
	J. Hoggan	1
	G. Kleinschmidt	29
	D. Sharp	1
	L. Smith	2
	C. Van Slyke	3
	L. Williams	4
Illinois	S. Trees	2
Maine	D. Wilson	4
Michigan	R. Chase	14
Missouri	T. Wagner	24
Montana	L. Baier	1
	R. Totten	4
Nebraska	R. O'Keefe	1
Nevada	W. Schafer	1
North Dakota	R. Johansen	4
Oregon	R. Clarke	1
	D. Hane	5
	M. Johnson	62
	G. Vogt	2
	J. Zalewski	79
Pennsylvania	P. Grun	3
South Dakota	W. Renken	1
Texas	D. Smallwood	6
Washington	B. Dean	1
	L. Hiller	2
	M. Martin	157
Wisconsin	R. Rominsky	2
	J. Schoeneman	10
	J. Staub	4
Wyoming	K. Bohnenblust	1
	C. Sears	1

Seedling tubers or seeds:			
Alberta	D. Lynch	60+	families
California	R. Voss	43	"
Colorado	J. Twomey	133	"
No Dakota	R. Johansen	98	"
Oregon	D. Hane	13	"
Texas	J. C. Miller, Jr	11	"
Maryland	R. Webb	16	crosses
Peru	C. Brown	8	"
	H. Mendoza	20	"
Poland	K. Swiezynski	2	"
Brazil	J. Babka	1	composite

INDIANA

H. T. Erickson

Potato Breeding

Two clones, 78-59-1 and 77-92-1, are being increased for extensive trials. Both are mid-season, high dry matter round whites with good scab resistance. They have been exceptionally free of tuber defects.

In the summer of 1981 a total of 135 clones were observed. Of these 44 were selections from previous years and 91 were first year selections grown in 5-hill plots. Approximately 40 have been retained for further observation and test.

Some 15,000 seedlings of 18 families were field grown from transplants. The most satisfactory schedule involves seeding in flats the first week in April. After about 2 weeks they are transplanted to 5 x 5 cm peat pots, which are field planted in mid May. It is advisable to grow seedlings under 18 to 24 hr photoperiods to reduce precocious tuberization. Plants reach maturity by September for the most part.

Selections are monitored for soluble tuber protein. Table 1 gives the average protein content for selections of the 18 seedling families. While the number of clones per family is variable it is apparent that families differ in protein content. Those having one high protein parent tended to have higher values. The table also shows relative dry matter. It should be noted that family 81-5 which was highest in protein was also number one in total dry matter. Evidently the two can be increased simultaneously, and this agrees with earlier observations.

Plants were regenerated *in vitro* from tuber discs and about 2500 grown in the field. Extensive data were collected to verify the existence of possible variability which might have arisen. While a few aberrant plants appeared it will be necessary to grow another clonal generation to get precise data on the degree of variation present. The variety "Superior" was used.

Indiana Table 1. Soluble protein and dry matter among seedlings of several crosses. Grown on mineral soil.

Progeny	Protein[1/] Ave	S.D.	Dry Matter[2/] Ave	S.D.	N
81-1	.91	.18	3.16	.53	29
81-2	1.00	.20	3.23	.46	37
81-3	1.16	.23	3.16	.50	36
81-4	1.26	.22	3.64*	.27	9
81-5	1.36*	.32	3.65*	.48	52
81-6	1.15	.08	3.46*	.21	5
81-7	.99	.27	3.21*	.50	29
81-8	.96	.17	2.71*	.36	7
81-9	1.11*	.19	2.98*	.38	9
81-10	.89*	.16	2.60	.35	9
81-11	.97	.30	2.30	0	2
81-12	1.35*	.22	3.38	.12	6
81-13	.80	.06	2.60*	.14	3
81-14	1.21*	.23	3.14	.38	21
81-15	.91	.18	2.36*	.24	9
81-16	.80	.26	2.34	.33	9
81-17	1.00	.21	3.32*	.42	24
81-18	1.06	.34	2.98*	.50	24

* One parent high for this trait.

1/ Soluble protein on a fresh weight basis.

2/ Relative scale. Larger values have greater dry matter.

Kansas

J. K. Greig

Potato Variety and Seedling Evaluation

Thirteen varieties and 13 seedlings were evaluated for yield and quality determinations at Manhattan.

Climatic Conditions:

The average monthly temperature by months follows: April 63, May 62, June 76, and July 79°F. The planting was irrigated three times, twice in April and once in June. Defects were numerous. Early maturity types generally were superior to late maturity selections. Table 1 gives the results of this study.

Table 1. Results of Regional and Commercial Potato Variety Trials, Manhattan, 1981

Variety	Yield cwt/acre		Defects[1]				Quality	
	Wt. of US#1	Total	Scab	Second growth	Cracks	Internal necrosis	Appearance	Specific gravity
Red Pontiac	199	230	3	4	3	1	3	1.053
Crystal	174	244	2	2	1	1	1	1.072
Denali	167	199	2	2	1	1	2	1.085
A 219.70-3	168	230	2	1	1	1	2	1.059
ND 8777	167	211	3	2	2	3	1	1.055
Dakchip	167	205	2	3	1	1	2	1.071
A 129.69-1	147	190	2	1	1	1	2	1.064
Wisc. 726	138	175	2	3	1	1	3	1.071
A 7.67-1	124	169	1	1	1	1	1	1.056
Norchip (R)	66	170	2	2	1	1	2	1.072
Superior	116	145	1	1	1	1	1	1.073
Red LaSoda	115	152	2	1	1	1	2	1.045
Wisc. 774-R	112	180	1	2	1	1	3	1.054
Norchip	109	152	2	2	1	1	2	1.070
Viking	98	118	1	1	1	1	1	1.056
LA 71-96	91	173	2	3	1	1	3	1.060
ND 161-62	85	167	1	3	1	1	2	1.075
LA 31-124	80	155	1	2	1	2	2	1.057
Norland (R)	74	119	1	1	1	1	1	1.061
Red Norland	72	123	1	1	1	1	1	1.059
ND 55-7	69	142	2	2	2	1	2	1.067
Russet Burbank	65	176	1	4	1	1	3	1.063
ND 146-4R	61	98	3	4	1	1	1	1.069
ND 119-3	51	98	1	2	1	1	1	1.068
Lemhi	141	141	1	5	1	1	3	1.062
ND 9781	129	129	3	2	1	1	3	1.063
LSD	34	41						.005

Planted: March 24

Fertilizer:

N	-	P_2O_5	-	K_2O	lb/A
24	+	114	+	0	preplant
50	+	0	+	0	April 27
50	+	0	+	0	June 2

Spacing: Plants 1 foot apart in 3-foot rows

Irrigated: April 6, April 25, and June 8

Soil Insecticide: Diazinon 4 lb/A
Fungicide: Diathane 45
Herbicide: Eptam 3.0 lb/A
Insecticides: Sevin and Thiodan
Harvested: July 24

1/ 1 = superior; 2 = average; and 3 = inferior

Louisiana

James F. Fontenot, D. W. Newsom, H. M. Brewer,
A. C. Miller, W. A. Poillion, and P. Wilson

Potato Breeding and Development

Objectives. The principal objectives of the Louisiana potato breeding project are wide adaptability, high yield, frost, heat and drought resistance, insect and disease resistance (particularly late blight and scab), improved culinary quality (including chipping quality, french frying quality, and baking quality), resistance to after-cooking darkening, improved storage ability, better shape and skin color and resistance to tuber greening. Development of an oblong russet type adapted to Louisiana conditions is highly desirable.

Other objectives are to gain a further insight into the physiological changes during rest and to ascertain the effect of growth regulators, applied as preplant, preharvest treatments on the production, storage ability and quality of potatoes. The total alkaloid content must be investigated. Air pollution may be a limiting factor in potato production and cultivar selection is essential to minimize yield losses.

Justification. Very few southern states have seen fit to include potato breeding as a research project for their state. Since none of these states, including Louisiana, produced certified seed potatoes it is of utmost importance that wide adaptability be our primary objective. We are unique in this respect because we realize unless a new clone will produce well in the areas of certified seed production (north) it will not be available for southern production no matter what its producing potential.

The potato ranks with rice and wheat as the world's leading food crops and is the world's leading vegetable crop. It is one of the cheapest sources of carbohydrates and furnishes appreciable amounts of Vitamin B and C. The per capita consumption of this vegetable has increased to over 100 pounds. The rapid expansion of the potato processing industry in the United States is one of the momentous developments in the field of food processing. This is coupled with the increase in per capita consumption of processed potatoes in the form of chips, frozen, dehydrated, canned and miscellaneous snack foods. For these reasons plus the fact a different type potato is needed for most uses it is paramount that the development of improved varieties be continued.

Important potato problems are also susceptibility or resistance to air pollution, insects, diseases, frost, heat, drought, and greening and any scientific knowledge that can be obtained could help explain the physiological basis for these factors. Furthermore, any new information obtained that concerns rest, dormancy, or suberization would certainly be a contribution.

Some 1981 results. We again participated in the regional trial table, and after scoring each entry on scab, growth cracks, second growth, sun green, hollow heart, internal necrosis, vascular discoloration, yield and culinary quality it was determined that ND146-4R was best, followed by Minn. 10162, Neb. A219.70-3, L71-96, and Norchip.

Results of a replicated trial conducted at Calhoun, La. are found in table 2. Red LaSoda was the most outstanding cultivars in yield of number ones and total yield. Other high yielding lines were 42-38, 71-72, 01-38 and 31-124. An observational yield trial was also conducted at Calhoun (table 3). A white skinned line, 81-20, yielded more than Red LaSoda. Other promising lines in this experiment were 01-44, 01-31, and 71-24. Some outstanding russet types in this test were 01-20, 01-31, and 02-13.

Other spring yield trials which are not presented in table form were conducted in Baton Rouge. In a source of seed test where Louisiana grown seed was compared to northern grown seed. It was observed that northern grown Red LaSoda produced three times more tonnage than Louisiana grown Red LaSoda. Lines 42-38 and 31-124 produced significantly higher yields from a southern seed source composed to northern seed. In a replicated test in which 1978 lines were composed it was found that the best lines were 81-7, 81-20, 81-24, 82-119, 81-167, and 81-173. In other experiment it was determined that 81-24 outyielded Red LaSoda. More good lines though they were inferior to Red LaSoda in this trial were 42-38, 81-20 and 81-173. In yet another experiment the best clones were 51-238 and 71-72, and 43-18.

Fall Yields: A fall potato cultivar study conducted at Hammond, La is indicated in table 4. Clone 81-7 produced a significantly higher yield than all lines except 81-20 this included Red LaSoda from two different sources. The most outstanding lines grown in Baton Rouge this fall were 01-47, 71-96, 01-4, 01-8, 01-50, Red LaSoda, Norland, N0146-4R, ND119-3, and Minn. 10162. In September 99 first year clones were selected at Rhinelander, Wisconsin and will be planted in Louisiana this spring. This represents individuals from 23 different families.

Culinary Studies: Specific gravity and some culinary rating of our 1980 selections are reported in table 5. Lines with very high gravity were 01-1, 01-5, 01-19, 01-27, 01-28, 01-29 and 01-38. Clones that chipped well were 01-7, 02-13, 01-19, 01-33, 01-38, 01-44, and 01-51. The best french fries were made from 01-7, 01,18, 01-33, 01-38, 01-41, 01-43, 01-44, 01-47, and 01-51. We consider it important that any future cultivar should show very little darkening after cooking and our best lines with this characteristic were 01-15, 01-27, 01-29 and 01-44. Culinary studies were conducted on all clones grown at Baton Rouge, Calhoun, Chase, Diamond and Hammond.

Louisiana Table 1. Yield and important information on some lines grown at Baton Rouge in 1981.

Variety	Aver. Mat.[1]	Most Representative Scab Area-Type[2]	CWT/A Aver. Yield	CWT/A Aver. Yield US #1	Aver. Percent US #1	Aver Total Solids	Gen. Merit Rating[3]	Chip Color[4]	Comments and General Notes
Early to Medium Early									
ND146-4R	2	0	197	130	66	16.0	1	2.4	excellent french fries
Norland	1	T	141	76	54	15.0		4.2	
Medium to Late									
Neb. A129.69-1	3	T	185	150	81	15.0		5.2	
Neb. A219.70-3	3	T	230	125	53	16.5	3	7.8	
Neb. 7.67-1	3	T	149	43	29	15.0		7.6	
Minn. 9781	3	T	149	76	51	16.9		3.4	
Minn. 8777	3	T	195	106	54	16.0		5.6	
Minn. 10162	3	T	179	109	61	19.2	2	3.2	excellent french fries
La. 71-96	5	0	183	119	65	17.7	4	5.6	no after-cooking darkening
La. 31-124	4	T	235	165	70	16.5		4.8	good french fries
ND 119-3	3	T	132	63	48	15.0		4.4	excellent french fries
ND 55-7	3	T	217	143	66	15.6		3.4	excellent french fries
Red Pontiac	4	0	231	131	57	15.0		7.0	
Russet Burbank	5	0	154	38	25	16.9		5.8	little after-cooking darkening
Norchip	3	T	246	144	59	17.7	5	3.4	excellent french fries

1/ 1-Very Early-Norland maturity; 2-Early-Irish Cobbler maturity; 3-Medium-Red Pontiac maturity; 4-Late-Katahdin maturity; 5-Very Late-Kennebec or Russet Burbank maturity.

2/ AREA - T-less than 1%; 1 - 1-20%; 2 - 21-40%; 3 - 41-60%; 4 - 61-80% 5 - 81-100%. TYPE - 1. Small, superficial 2. Larger, superficial, 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes

3/ Place top five among all entries including check varieties; disregard maturity classification. (Rate first, second, third, fourth and fifth (in order) for overall worth as a variety.

4/ Chip Color - PCII Color Chart or Agtron.

Replicated yield trial conducted at Calhoun, Louisiana in 1981
Louisiana Table 2 Calhoun, Louisiana

Line	Marketable Yield cwt per Acre 1's	2's	Total	Remarks
Red LaSoda	367.2	40.2	407.4	nice red, some second growth
42-38	323.2	41.1	364.3	smooth red oval
71-72	303.0	28.8	331.8	slightly rough white, oval to oblong
01-38	302.1	22.0	324.1	smooth white, oblong
31-124	295.5	47.7	343.2	slightly rough white, oval to oblong
8i-24	278.8	43.7	322.5	smooth white, oval
51-238	275.7	39.0	314.7	oblong white, some second growth
Monona	238.9	17.4	256.3	nice white, oval to slightly oblong
01-33	233.0	40.5	273.5	nice white, oval to oblong
43-18	231.9	35.5	267.4	purple, oval to oblong
01-45	224.9	36.8	261.7	white, oval to oblong
01-47	222.3	58.8	281.1	white, oval to oblong, some rough
81-7	216.5	22.2	238.7	smooth white, oval
81-5	203.4	7.8	211.2	smooth white, oval to oblong
01-50	188.4	87.3	275.7	very smooth oval white, small, yellow flesh
01-39	180.3	35.5	215.8	oval white, some early cracking
01-11	160.5	198.8	359.3	late, smooth white, long stolons
01-42	150.7	30.5	181.2	white, oval to oblong, some cracks
01-40	127.2	30.9	158.1	smooth white, oblong

Fertilizer applied February 23 at the rate of 650 obs. of 8-24-24 per acre, planted February 24, 15 ft. plots, replicated four times, top-dressed April 8 with 100 lbs. of ammonium nitrate per acre and again April 23 with 60 obs. per acre. Harvested June 9.

Observational yield trial conducted at Calhoun, Louisiana in 1981.
Louisiana Table 3. Calhoun, Louisiana

Line	Marketable Yield cwt per acre 1's	2's	Total	Remarks
81-20	384.2	36.6	420.8	large white, oblong
Red LaSoda	367.2	40.2	407.4	nice red but some second growth and cracks
01-44	316.2	41.8	358.0	smooth white oval
01-4	298.0	52.3	350.3	nice white, oval
01-31	250.0	22.6	272.6	nice white oval, slight russett
71-24	248.3	40.1	288.4	white, oblong
01-10	239.6	27.9	267.5	
01-8	235.2	13.1	248.3	smooth white, oval
01-17	223.0	40.1	263.1	smooth white, oval
01-29	210.8	38.3	249.1	smooth white oval, a few fresh cracks
01-30	204.7	53.1	257.8	smooth white, oblong
02-13	188.2	19.2	207.4	smooth red, oval, russett
02-6	187.3	41.0	228.3	smooth red, oval
01-23	186.4	56.6	243.0	white, oval to oblong, a little rough
01-26	184.3	21.8	206.1	smooth white, oval, small
01-20	174.2	54.9	229.1	smooth, oval, extreme russett
01-14	169.9	45.3	215.2	white, oval, some cracks and purple in flesh
01-18	158.6	28.8	187.4	smooth white, oval

Fertilier applied February 23 at the rate of 650 lbs. of 8-24-24 per acre, planted February 24, 15 ft. plots, 2 reps, top-dressed April 8 with 100 lbs. of ammonium nitrate per acre and again April 23 with 60 lbs. per acre. Harvested June 9.

Louisiana table 4. Fall potato cultivars study conducted at Hammond, Louisiana in 1981.

Cultivar	Bushels Per Acre		
	US#1	US#2	Total
81-7	152 a[1]	15 ab	167 a
81-20	109 ab	10 ab	119 ab
81-167	96 b	9 ab	105 bc
81-81	91 bc	20 a	111 b
Red LaSoda ND	91 bc	12 ab	103 bc
42-38	90 bc	12 ab	102 bc
82-154	81 bc	13 ab	94 bc
81-178	80 bc	15 ab	95 bc
81-24	71 bcd	13 ab	84 bcd
81-173	67 bcd	9 ab	76 bcde
Monona	43 cd	10 ab	53 cdef
81-5	25 de	11 ab	36 def
Red LaSoda Minn.	23 de	8 ab	31 def
82-156	21 de	4 b	25 ef
51-238	15 e	9 ab	24 ef
82-119	14 e	5 b	19 f
43-18	14 e	14 ab	28 ef

[1]Cultivars with the same letter are not significantly different.

Planted: 8/25/81
3 replicates, randomized block design

Harvested: 11/20/81

Louisiana Table 5. Specific gravity and some culinary ratings of 1980 clones grown in Baton Rouge in 1981.

Variety	Specific Gravity	Chip Rating 1)	French Fry Rating 2)	After Cooking Darkening 3)	Remarks
(1) 01-1	1.097	6.6	4.4	7.0	russet, fair type
(2) 01-3	N.E.	4.4	3.4	4.8	very nice, some cracks
(3) 01-5	1.089	9.6	5.0	3.8	very nice, few cracks
(4) 01-7	1.088	3.4	2.4	5.2	oblong, russet orange
(5) 01-12	1.080	5.2	3.8	3.2	very nice type
(6) 01-13	1.086	3.2	2.6	5.2	russet red, rough
(7) 01-15	1.091	4.4	2.6	2.6	fair yield, russet, cracks
(8) 01-18	1.078	3.0	1.8	4.2	fair
(9) 01-19	1.093	2.2	2.6	4.2	very round and good
(10) 01-20	1.075	4.6	3.0	5.6	fair russet
(11) 01-21	1.088	4.2	3.2	3.4	many cracks
(12) 01-22	-	-	-	-	high yield,cracks
(13) 01-24	1.065	4.6	3.4	3.6	very nice, cracks
(14) 01-27	1.094	5.4	2.6	2.6	nice, high yield
(15) 01-28	1.100	8.6	2.8	4.6	fair
(16) 01-29	1.093	3.6	2.6	2.8	good
(17) 01-33	1.077	3.2	2.4	3.8	very nice
(18) 01-38	1.096	3.2	2.4	5.2	nice, cracks, beautiful blue flowers.
(19) 01-40	1.085	6.0	2.8	3.2	outstanding shape, yield fair
(20) 01-41	1.076	4.6	2.4	5.8	nice
(21) 01-43	1.073	3.8	2.2	5.4	nice
(22) 01-44	1.086	3.2	2.2	2.8	very white, high yield
(23) 01-47	1.073	5.2	2.4	4.0	nice
(24) 01-51	1.081	3.6	1.8	3.0	rough
(25) 01-53	1.068	5.4	2.6	5.0	fair
(26) 01-54	-	-	-	-	good in Wisconsin
(27) 01-55	-	-	-	-	good in Wisconsin
(28) 01-56	-	-	-	-	good in Wisconsin

1/ 1 = very white; 10 = very dark
2/ 1 = very white; 10 = very dark
3/ 1 = very white; 10 = very dark

MAINE

S. S. Leach, Raymon E. Webb and David Wilson

Resistance to Fusarium Tuber rot (Fusarium roseum 'Sambucinum' and Fusarium solani 'Coeruleum'). Inoculum for this test was grown on potato dextrose agar. Spores were washed from seven day old cultures and adjusted to 50,000 per ml. The tubers of the test clones were inoculated with a hypodermic syringe midway between the bud and stem ends. The inoculum (100 spores) was injected into the tubers 7 mm below the tuber surface. The incoluated tubers were stored in a controlled environment room maintained at 55°F (13°C) and 95 percent relative humidity for 21 days. At the end of the storage period, the tubers were removed and scored for tuber rot development and amount of sprouting. The degree of rot in a tuber was determined by cutting through the inoculation sites and observing the degree of infection. This year, 6 round white and 6 russet-type clones were tested. Because of a lack of round white tubers for testing, only the russet types were tested for their reaction to both strains of the fungus. Clone B7200-33 is the reference clone as it has shown a very high degree of resistance in previous tests.

Clones B7200-33, B8881-5, B8943-4 and B8972-1 showed moderate-high degrees of resistance (Table 1). B8972-1 is a very promising russet-type with a moderate degree of Fusarium resistance. It should be an excellent potato for fresh market and processing.

Table 1. Resistance of breeding clones to *Fusarium roseum* 'Sambucinum' and *Fusarium solani* 'Coeruleum'

Clone	Disease rating 1/ *F. roseum* 'Sambucinum'	*F. solani* 'Coeruleum'
Round Type		
B 7200-33	5	
B 8710-16	2	
B 8751-6	1	
B 8685-4	2	
B 8821-5	4	
B 7805-1	3	
Russet Type		
B 8833-6	2	7
B 8848-2	1	7
B 8934-4	1	7
B 8939-8	2	8
B 8943-4	4	8
B 8972-1	4	7

1/Rating 0-9: 9 = no disease; 0 = severe disease systems.

MAINE - 1981

Hugh J. Murphy and Leigh S. Morrow

Cooperative variety trials were conducted during 1981 at Presque Isle and Newport, Maine. Soil and weather conditions during May and June were excellent for planting and early growth. Because of ideal soil and moisture conditions, plant stands were near perfect for most varieties. Rainfall for July was below normal but August had about three acre inches above normal which caused some late blight and tuber rot problems. Tubers sized up larger than normal but were killed early enough to prevent oversize.

Plots at all test locations were single rows, 25 feet long, and replicated six times per variety. Planting, killing, and harvesting dates; seedpiece spacing, and fertilization rates used at both test locations are presented in Maine Table 4.

Yields and specific gravities for all varieties grown at Presque Isle and Newport are presented in Maine Table 1. The ten highest yielding varieties at Presque Isle in descending order were: B8086-3, Rosa, Michibonne, Kennebec, Lemhi, MN8757, B6043-WV6, BR7093-23, Chipbelle, and Butte. The nine highest ranking varieties in specific gravity were: Chipbelle, Lemhi, Russet Burbank, Butte, MN8224, Rosa, BR7088-18, MN9319, and Trent. Yields of all varieties at Newport were low, since this trial had to be killed two weeks early because of a late blight infection. The five highest ranking varieties in specific gravity were: Chipbelle, Denali, Atlantic, Belchip, and BR7088-18.

Tuber size distribution determinations for U.S. #1 and U.S. #1 (size A) are presented in Maine Table 2. All varieties grown at Newport had high percentages of tubers below 2½ inches in size because of the early killing date. Growth cracks and misshapen tubers were prevalent in most varieties grown at Presque Isle. Many varieties had a number of tubers with hollow heart.

Results of the first chipping and french fry color tests with tubers from 50° F storage are presented in Maine Table 3. Seedling C7232-4 grown at Presque Isle and Chipbelle and C7232-4 grown at Newport had acceptable chip color (<7.0). Thirty-four of the 48 varieties grown at Presque Isle had acceptable french fry color (<3.0). Many of the varieties grown at Presque Isle had unacceptable french fry texture (>1.2).

Complete details of the Maine cooperative variety trials are presented in the 1981 Performance Evaluations of Potato Clones and Varieties in The Northeastern States. This will be published by the Life Sciences and Agricultural Experiment Station as Bulletin 782 and is available from the Public Information and Central Services (PICS), University of Maine; Orono, Maine 04469.

Maine Table 1. Yield by hundredweight per acre and specific gravity for varieties grown at two locations in Maine - 1981.

Variety	Presque Isle		Newport	
	Yield	Specific gravity	Yield	Specific gravity
Allagash Russet			120	1.070
Atlantic			136	1.087
Belchip			108	1.085
Buckskin			128	1.083
Butte	449	1.084		
Chipbelle	464	1.095	97	1.097
Croatan	375	1.064		
Denali			140	1.088
Katahdin	426	1.077	152	1.076
Kennebec (med.)	382	1.068	153	1.076
Kennebec (med. late)	489	1.069		
Lemhi	484	1.094		
Michibonne	491	1.071	165	1.077
Michimac	405	1.067	172	1.072
Monona			154	1.076
Norchip			122	1.082
Rideau	289	1.066		
Rosa	520	1.083		
Russet Burbank	421	1.085		
Shepody	457	1.079		
Superior	345	1.073	121	1.075
Trent	220	1.081		
Yukon Gold	318	1.080		
AF92-3	437	1.064		
AF186-5			133	1.081
AF201-25	341	1.069		
AF238-21	410	1.073	118	1.076
AF238-66	403	1.067	116	1.076
AF303-5	405	1.074	166	1.083
AF330-1	285	1.073	86	1.058
B6043-WV6	466	1.067		
B8086-3	542	1.079	179	1.072
B8943-4	373	1.080		
B8972-1	368	1.080		
BR5991-WV16	423	1.079		
BR7088-18	393	1.083	134	1.084
BR7093-23	466	1.080	111	1.074
C7232-4	302	1.075	94	1.075
C72132-2	388	1.075		
C7358-14A	366	1.074		
C7358-26A	377	1.072		
C7490-2	299	1.068		
C74109-8	367	1.070		
CC26-1A	334	1.075	143	1.082

Maine Table 1 - continued

Variety	Presque Isle		Newport	
	Yield	Specific gravity	Yield	Specific gravity
CF7353-1	391	1.071	139	1.078
CF7523-1	347	1.069	146	1.071
F68036	452	1.070		
F69026	347	1.067	165	1.071
F73008	443	1.073	140	1.082
G6880-1	252	1.076		
G712-1	303	1.078	109	1.075
MN7973	341	1.067		
MN8224	347	1.084		
MN8757	468	1.063	185	1.070
MN9319	420	1.082		
W564-3A			115	1.070
W718	436	1.064		
Waller Duncan L.S.D. (0.05)	42	0.003	46	0.005

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at Presque Isle and Newport, Maine - 1981.

Variety	Presque Isle		Newport	
	1-7/8 to 4 inches	2-1/2 to 4 inches	1-7/8 to 4 inches	2-1/2 to 4 inches
Allagash Russet			85.6	16.0
Atlantic			91.9	37.4
Belchip			89.0	24.5
Buckskin			90.1	23.8
Butte	33.5 % 4 - 10 ounces			
Chipbelle	97.6	69.6	84.4	13.8
Croatan	97.1	63.3		
Denali			88.9	19.3
Katahdin	88.2	77.6	93.2	40.8
Kennebec (med.)	94.4	72.8	91.7	39.2
Kennebec (med. late)	92.5	75.5		
Lemhi	28.1 % 4 - 10 ounces			
Michibonne	96.9	77.7	92.9	38.3
Michimac	95.8	66.0	91.0	36.4
Monona			93.3	29.7
Norchip			86.4	10.7
Rideau	95.8	71.7		
Rosa	96.2	58.0		
Russet Burbank	24.4 % 4 - 10 ounces			
Shepody	42.7 % 4 - 10 ounces			
Superior	98.2	58.5	90.7	23.6
Trent	96.7	55.3		
Yukon Gold	97.4	75.8		
AF92-3	94.0	71.7		
AF186-5			89.1	19.4
AF201-25	97.7	65.0		
AF238-21	97.6	65.3	84.2	14.2
AF238-66	96.6	62.9	81.0	6.4
AF303-5	96.1	75.2	91.2	28.3
AF330-1	95.9	41.6	81.1	15.0
B6043-WV6	97.8	68.1		
B8086-3	91.8	69.2	93.3	46.3
B8943-4	15.5 % 4 - 10 ounces			
B8972-1	14.5 % 4 - 10 ounces			
BR5991-WV16	96.5	53.7		
BR7088-18	97.2	69.6	93.2	31.8
BR7093-23	94.7	71.5	87.7	27.3
C7232-4	96.6	54.2	86.0	15.0
C72132-2	96.0	58.5		
C7358-14A	97.2	66.0		
C7358-26A	97.7	70.5		
C7490-2	97.9	32.5		

Maine Table 2 - continued

Variety	Presque Isle		Newport	
	1-7/8 to 4 inches	2-1/2 to 4 inches	1-7/8 to 4 inches	2-1/2 to 4 inches
C74109-8	97.5	55.9		
CC26-1A	96.3	41.2	90.9	25.9
CF7353-1	97.6	71.3	94.4	37.7
CF7523-1	95.0	43.3	90.9	18.1
F68036	34.1 % 4 - 10 ounces			
F69026	97.0	52.6	91.4	31.6
F73008	97.8	58.2	89.4	20.1
G6880-1	97.8	54.3		
G712-1	98.0	53.3	84.0	14.5
MN7973	98.3	73.9		
MN8224	95.4	52.2		
MN8757	88.7	75.4	95.1	67.9
MN9319	30.9 % 4 - 10 ounces			
W564-3A			84.0	12.7
W718	96.9	66.9		

Maine Table 3. Chip color and french fry color and texture indices for potato varieties grown at Presque Isle and Newport, Maine - 1981.

Variety	Presque Isle			Newport
	Chip Color[1]	French fry Color[2]	French fry Texture[3]	Chip Color[1]
Allagash Russet				8.1
Atlantic				8.1
Belchip				8.2
Buckskin				8.2
Butte	10.0	4.4	1.4	
Chipbelle	8.1	2.1	1.3	6.7
Croatan	8.6	2.4	1.0	
Denali				8.4
Katahdin	9.3	3.3	1.6	9.4
Kennebec (med.)	9.3	2.6	1.0	9.3
Kennebec (med. late)	9.2	3.0	1.4	
Lemhi	9.5	3.0	1.8	
Michibonne	9.5	3.0	1.5	9.2
Michimac	9.2	2.7	1.9	8.9
Monona				7.6
Norchip				8.2
Rideau	10.0	4.5	2.1	
Rosa	8.1	1.7	1.5	
Russet Burbank	9.5	3.4	1.5	
Shepody	8.8	3.0	1.6	
Superior	9.1	3.0	1.4	9.1
Trent	8.8	2.5	1.2	
Yukon Gold	9.9	4.1	1.0	
AF92-3	8.6	2.4	2.1	
AF186-5				8.0
AF201-25	9.1	3.2	1.8	
AF238-21	8.8	2.5	1.0	7.9
AF238-66	8.2	2.0	1.2	7.9
AF303-5	8.7	2.6	2.2	8.8
AF330-1	8.0	1.7	1.1	7.8
B6043-WV6	9.3	3.6	1.0	
B8086-3	9.4	3.4	1.1	9.9
B8943-4	9.1	2.6	1.8	
B8972-1	8.9	2.6	1.5	
BR5991-WV16	8.3	2.3	1.5	
BR7088-18	8.4	1.9	1.5	8.6
BR7093-23	8.1	2.4	1.3	8.3
C7232-4	6.4	1.0	1.0	6.6
C72132-2	8.8	2.4	1.2	
C7358-14A	8.7	2.7	1.5	
C7358-26A	9.6	3.4	1.1	
C7490-2	8.3	2.8	1.1	

Maine Table 3 - continued

Variety	Presque Isle			Newport
	Chip Color[1]	French fry Color[2]	French fry Texture[3]	Chip Color[1]
C74109-8	9.6	3.3	1.1	
CC26-1A	8.9	3.1	1.0	8.3
CF7353-1	7.8	1.6	1.6	8.5
CF7523-1	10.0	3.6	1.0	9.5
F68036	9.9	4.4	1.7	
F69026	8.6	2.6	1.0	8.1
F73008	9.0	2.3	2.0	8.2
G6880-1	8.1	2.5	1.0	
G712-1	8.9	2.9	1.2	9.6
MN7937	9.4	2.9	2.2	
MN8224	8.5	1.5	0.9	
MN8757	10.0	4.6	1.3	10.0
MN9319	8.3	2.3	1.9	
W564-3A				9.9
W718	8.7	1.7	1.3	
Waller Duncan L.S.D. (0.05)	0.5	0.4	0.5	0.5

[1]Chips with lower indices are lighter in color as read on PCII Reference Chart 1206-4.

[2]French fries with lower indices are lighter in color as read from U.S.D.A. Color Standards for Frozen French Fries.

[3]Lower texture indices indicate a mealier texture.

Maine Table 4. Pertinent information about the Maine Cooperative Potato Variety Trials - 1981.

Location and Maturity Season	Date Planted	Date Killed	Date Harvested	Fertilization	Spacing
Presque Isle					
Early & Med. Early Varieties	May 12	August 24	September 2	130-130-130	[1]/
Medium Varieties	May 12	August 19-24	August 29	130-130-130	[1]/
Medium Late Varieties	May 12	September 4	September 18	130-130-130	[1]/
Late Varieties	May 12	September 15	September 30	130-130-130	[1]/
Russet & Long Type Varieties	May 12	September 21	October 1	130-130-130	[2]/
Newport					
All Varieties	May 28	August 28	September 29	140-140-140	[1]/

[1]/ Seedpieces of all varieties spaced 8 inches apart.

[2]/ Seedpieces of MN9319 spaced 10 inches apart.
Seedpieces of B8943-4 and B8972-1 spaced 12 inches apart.
Seedpieces of Lemhi spaced 14 inches apart.
All other seedpieces spaced 16 inches apart.

MAINE -- 1981

Alvin F. Reeves, Robert B. Long, and Garland S. Grounds

Potato Breeding

Seed and seedling production. Emphasis remains on crossing selections which are russet-skinned, early-maturing, good processing, and with multiple-disease-resistance. Over 50 parents were used in 45 different crosses to produce 27,030 true seeds. From open-pollinated fruits from field-grown 12-hill plots, 316,300 seeds were harvested. Seeds from 79 family lines were planted in April and June. A total of 22,273 transplants were grown to maturity; approximately one-third of these were grown in plasitc pots outdoors, the remainder were held in greenhouse pots. An average of 83% of the transplants produced tubers large enough to harvest (18,466); 57% had second tubers (12,605).

Treatment of true seed with gibberellin. An attempt was made to enhance the germination of seed lots used in the breeding program. It was felt that seeds with a longer dormancy should produce selections with long dormant tubers, and that these types were being overlooked in the regular program due to the natural selection for early germinating seeds. When two kinds of gibberellin were tested in two types of application with both distilled and tap water, no effects were seen. Three different seed lots were used: 840, 475, and 110 days old. There were differences in germination between seed lots (61.6%, 1.75%, and 43.5% respectively), but none were enhanced by any treatment. When open-pollinated seeds only one day old were treated with 2,000 ppm GA_3, the treated seeds seemed to emerge earlier than the untreated; but in the final analysis, there were no differences in the numbers germinating. It is possible that there is some time between immediately after harvest and 110 days later that gibberellin is effective, but we have given up looking for it.

Method of planting. Seedlings were again grown in two locations at Presque Isle: Aroostook Farm and Gartley Farm. Fertilization rate was 115 pounds nitrogen per acre applied in the form of 14-14-14 for seed increase plots and early maturing yield tests. Medium maturity selections received 130 pounds; and later maturing tests, including storage tests, chip tests, and hollow heart and frost tests, received 145 pound nitrogen. Seed piece spacing was 10 inches for all plots except the single-hills which were planted at 30 inches. Yield tests were divided into early, medium and medium-late maturing types. Each selection in each yield test contained four replications of 20 hills each.

	Gartley Farm	Aroostook Farm
Planting dates	5/7-9;5/20	5/11-12,21,26-27;6/1-8,30
Killing dates	7/31;8/13,19	8/11,14,18,28;9/1,16
Harvest dates	8/20,24-26,31;9/1,3,4	8/21;9/2,8,15,16,26,28,20;10/1,6

Seedling selection. A total of 325 (1.35%) selections were saved from approximately 24,000 single-hill seedlings. From the 309 12-hill selections, 50 (16%) were saved for further testing. Twenty-four third year selections were tested in 20-hill, 60-hill, and disease plots. All were retained for further testing. Fifty of the 89 Campbell third-year selections were retained.

Cell cloning. Seventy-seven clones derived from Dr. Alan Langille's cell culture work at Kansas State University and at Orono were grown at the Gartley Farm in Presque Isle in 1981. Since these were all obtained from Russet Burbank cell cultures, and all were planted late (6/1), none matured enough for adequate selection or evaluation. All were sampled and will be replanted in 1982. Weeds were a problem in this late planted material also, but vine observations on 8/18 indicated that several aberrant types will be seen in this kind of material.

Disease tests. In cooperation with Drs. Frank Manzer and Richard Storch, a number of seedlings were tested for resistance to the diseases listed below. Selected seedlings were sent to Dr. Bill Brodie for golden nematode resistance testing, and to Dr. Robert Young for late blight testing. Resistance to early blight was found in 2/8 of Maine selections tested and 11/71 Campbell selections; to late blight in 3/36 Maine and 7/160 Campbell; to common scab in 12/25 Maine and 46/160 Campbell; to acid scab in 4/30 Maine and 11/160 Campbell; to verticillium in 1/20 Maine and 6/72 Campbell; to virus X in 9/33 Maine and 53/168 Campbell; to leafroll in 2/47; to net necrosis in 32/35 Maine and 138/160 Campbell; to golden nematode in 14/32 Maine and 14/73 Campbell; to hollow heart in 3/10 Maine and 27/71 Campbell; to frost in 4/74; to tuber greening in 16/33 Maine and 32/168 Campbell.

Yield tests. A total of 118 selections were tested in replicated yield tests in 1981; 47 were from the regular program, 71 from the Campbell Institute seedlings. Of the regular selections four had higher yields than the controls, twenty had higher specific gravity, and one was better for both yield and gravity. Ten of the Campbell selections had higher yields than controls, 19 had higher gravity, and two were higher for both characteristics.

Grower trials of advanced selections. The 1981 trials included AF 205-9, AF 186-5, and CC 26-1a. Several growers were very pleased with the selection AF 205-9; however, size was a problem for three growers. The most serious problem with this variety was the Botrytis tuber rot which practically destroyed the crop of the Crane Brothers in Corinna. The several good reports indicating wide adaptability of this selection, its golden nematode resistance, and its excellent chipping qualities may overshadow the storage disease problem if it indeed turns out to be an isolated incident rather than a special susceptibility to that particular fungus.

The three seed growers in Maine who planted AF 186-5 were not impressed and recommended further testing of this seedling. Two ware growers in New York (where this selection has done better in the NE-107 replicated variety trials) had quite different experiences with AF 186-5. One reported high yields and fairly good appearance; the other had low yields and had to sell the crop as pickouts. This latter grower was planting on muck soil.

The only grower who had all three selections chose CC 26-1a as the best of the three. It is oblong in shape and can get too big if allowed to grow too late with high fertilizer rates. Three of the four growers were pleased with this selection. Five additional seedlings will be grown by Maine seed growers in 1982: AF 238-21, CF 7358-14; CF 7523-1, WF 564-3, and BR7093-23.

Campbell seed stocks. In addition to the Campbell third year selections 72 more advanced selections were maintained in 60-hill increase plots in 1981. Information on these selections is given in the section on yield tests. Since spindle tuber was detected in the 1980 third year selections, they were grown in 16-hill observation plots in 1981. Only 56 of the 72 selections were retained for further tests, although no spindle tuber was detected in these plots in 1981.

Several clones (232) saved from the Campbell parental material are available on request. These were maintained as 10-hill plots in 1980 and 1981. Spindle tuber was detected in some of these in 1980, but not in 1981. All tubers planted in 1981 were indexed in the greenhouse during the winter. Several suspicious greenhouse plants were replanted in a separate plot at Aroostook Farm in 1981. Two of these plants definitely showed the spindle tuber symptoms in the field planting. These were clones also growing in the 10-hill maintenance plots. None of the plants in the main plots had visual symptoms. A list of the 10-hill material available is given in Table 2.

Maine Table 1. Characteristics of some advanced potato clones in the Maine breeding program.

Pedigree number	Maturity[1]	Skin Color[2]	Type of tuber[3] [4]	Yield ability[4]	TGA[5] content[4]	Flavor[4]	Cooked color, table use[4]	Cooked color, french fries[4]	Texture of french fries[4]	Percent dry matter[4]	Storage life[4]	Bruising[4]	Resistance to[6]									
													Virus X	Leafroll	Net necrosis	Late blight	Early blight	Acid scab	Verticillium	Ring rot	Golden nematode	Common scab
AF 205- 9	ML	B	G	G	A	M	M	G	A	G	A	F	R	S	R	S	S	S	S	S	R	S
AF 186- 5	M	W	G	A	A	A	M	G	G	A	A	G	S	S	R	S	S	M	M	S	R	M
CC 26- 1a	M	C	G	A	M	A	A	A	G	G	M	G	R	S	R	S	S	S	S	S	S	S
AF 236- 1	ML	C	G	G	G	A	G	G	A	G	F	F	S	S	R	R	M	M	S	S	R	M
CF 7353- 1	ML	Pu	G	G	A	A	G	G	G	A	A	U	S	S	R	S	M	S	R	S	S	S
AF 238-21	ML	W	G	G	G	A	G	A	A	A	F	F	S	S	R	M	S	S	S	S	S	S
CF 7358-14	M	W	G	G	G	A	A	A	A	A	A	F	R	M	R	M	M	M	S	S	R	M
AF 324- 1	E	W	G	A	G	M	U	G	G	G	A	F	S	S	R	S	S	S	S	F	S	S
CF 7523- 1	M	W	G	G	A	G	G	A	G	G	A	F	S	S	R	M	M	S	M	F	R	M
WF 591- 1	M	R	G	G	A	F	M	A	G	G	F	F	S	S	R	S	M	S	M	S	S	S
AF 201-25	ML	B	G	G	M	F	F	M	M	A	F	F	S	S	R	R	M	M	S	S	R	S
AF 92- 3	ML	W	G	G	M	F	F	U	M	M	A	A	R	S	R	R	M	R	S	S	S	R
AF 221- 1	L	C	G	G	M	F	F	G	G	G	F	F	S	S	R	S	R	R	S	S	S	S
A 70114- 1	M	R	G	G	M	A	G	G	A	G	F	F	S	S	R	S	M	M	R	S	S	R
CF76183- 2	ME	C	G	G	A	F	G	G	A	G	G	F	S	S	R	M	S	S	S	F	S	R

Maine Table 1. continued

Pedigree number	Maturity[1]	Skin Color[2]	Type of tuber[3] [4]	Yield ability[4]	TGA[5] content[4]	Flavor[4]	Cooked color, table use[4]	Cooked color, french fries[4]	Texture of french fries[4]	Percent dry matter[4]	Storage life[4]	Bruising[4]	Resistance to[6]								
													Virus X	Leafroll	Net necrosis	Late blight	Early blight	Acid scab	Verticillium	Ring rot	Golden nematode	Common scab
CF 7679-15	M	C	G	G	A	A	A	M	A	G	G	F	R	S	R	S	S	S	R	F	S	S
CF 7688- 9	M	C	A	G	A	F	F	G	A	G	A	F	S	S	R	S	S	S	S	F	S	S
AF 300- 1	ME	WC	A	G	A	A	A	G	M	G	A	F	S	S	R	M	M	S	M	F	S	S
CF 7608- 9	ME	C	G	G	A	A	G	G	U	M	G	F	R	S	R	S	S	S	M	F	S	M
CF76123- 6	ME	C	G	G	M	F	F	G	G	A	G	F	S	S	R	S	S	S	S	F	S	S
AF 307- 5	M	W	G	G	A	A	M	A	A	M	A	F	S	R	R	M	M	M	S	F	S	R
AF 332- 9	M	B	A	A	A	A	G	M	G	G	G	F	S	S	R	M	M	S	R	F	R	M
AF 299-12	ME	W	A	A	A	A	G	G	G	A	F	F	S	S	R	M	M	M	S	F	S	M
CF 7666-11	E	W	G	A	A	A	A	G	M	A	G	F	F	S	R	S	S	S	S	F	M	S
AF 303- 5	ML	W	G	G	M	U	A	A	M	A	M	F	S	S	R	M	M	S	R	F	S	S
WF 564- 3a	M	R	G	A	A	A	M	U	A	M	G	F	R	S	R	R	M	M	S	S	S	R
AF 222- 1	ME	WC	A	A	A	M	A	G	G	G	F	F	S	S	R	S	S	M	S	F	S	R
AS 201-10	E	B	G	G	M	A	G	G	A	A	F	F	F	S	R	R	S	M	R	F	R	M
CF72107-15	M	W	G	G	A	A	A	U	M	G	F	F	S	S	R	R	M	S	S	F	R	M
CF74135- 3	E	W	A	G	M	A	G	A	A	M	F	F	S	S	R	S	M	R	S	F	S	R

Maine Table 1. continued

1/ Maturity: E = early, M = medium, L = late.
2/ Color: R = russet, W = white, B = buff, Pu = purple, C = cream.
3/ Type of tuber includes uniformity of shape, overall appearance, and presence of defects.
4/ Rates as: U = unacceptable, M = marginal, A = acceptable, G = good, or F = further testing needed.
5/ TGA = total glycoalkaloids.
6/ Resistance: R = resistant, M = moderatly resistant, S = susceptible, F = further testing needed.

Maine Table 2. List of clones saved from Campbell Institute Breeding Program

Pedigree	Color[1/]	Shape[2/]
Alaska Frostless	W	R
Arran Victory	Pu	R
Atzimba	-	-
Bevelander	Y	R
Dorita	W	O FL
Earlaine	W	R
Gloria	Y	O FL
Michibonne	W	R
Nipigon	W	OL FL
Noordeling	Y	R
Pimpernel	W	RO
Populair	W	RO
Rideau	Re	R
Saphir	WY	R
Sientje	WC	OL pts
Tawa	W	R
Trent	DC	R
Vokal	Y	OL
Voran	LY	RO
A 69657- 4	W	O
AC26619- 5	Y	R
ADX 245- 7	Re	O pts
AF 10-20 Rc	R	O
AF 22- 8 c	W	R
AF 24-33 c	W	O
AF 197- 2 c	YC	O
AF 279- 1 c	W	FL O
B 721- 1	W	R
B 922- 3	W	R
B 922- 6	W	RO
B 962- 3	W	R
B 2834- 3	LR	RO
B 2938-22	Y	R
B 3299-13	W	R
B 3429-23	WC	R FL

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
B 3606- 5	W	RO
B 3627- 1	CN	RO FL
B 3652- 8	W	R
B 3692- 4	W	OR
B 3721- 1	W	OR
B 3950- 1	WC	R
B 4087- 5	R	RO
B 4088- 4	irreg. R	OR FL
B 4090- 5	W	OL
B 4093-18	R	R
B 4121- 7	WC	O FL
B 4312- 4	Re	R
B 4557- 2	W	RO
B 4829- 7	W	RO
B 5398- 4	W	RO
B 5422-10	W	R (FL)
B 5662- WV4	W	R
B 6028- WV6	WC	RO
B 6038- 3	WC	RO
B 6043- WV6	W	O
B 6139-11	W	O
B 6376- 6	B	R
B 6503- 2	W	RO
B 6532- 4	B	O
B 6603-6P	DC	RO
B 6949- WV3	W	R FL
B 6969- 2	W	R (O)
B 7160- 4R	R	O
B 7196- 4	R	O
B 7200-33	W	OL
BL 61-74-167	W	R
BR 5957- 7	W	RO
BR 5960- 5	C	R
BR 5967- 7	DC	R

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
BR 5991- WV16	W	RO
BR 5991- WV25	W	RO
BR 6261- 1	W	RO
BR 6820-26	W	R
BR 6831- 5	WC	R
BR 7085- 1	C	FL OL
BR 7088-18	W	R
BR 7090-17	W	O (FL)
BR 7104-10	W!	O FL
BR 7105-14	W	R
BR 7108- 2	W	R
BT 5043- 2Rd	Re	R
CA 02- 8	W	R (FL)
CA 46-11	WC	OL
CA 53- 6	DC	R
CA 67- 2	C	RO
CA 70-13	W	OL pts
CA 74- 6Rd	Pi	R
CA 88- 2	W	O
CA 90-17	C	O
CA 90-19	W	R
CA 93- 2	W	O FL
CC 08- 3	W	R
CD 10- 5a	WC	RO
CD 13- 2Ra	R	RO
CD 28- 1	W	O
CD 79- 3a	W	RO
CD 89- 3a	R	OL
CD 95- 5a	W	RO
CD 103- 7a	W	R
CD 112- 4a	W Pu	R
CD 130- 5Ra	W	RO
CD 137- 5R	BN	R
CD 148- 50	W	O
CD 148- 56	WC	O

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
CS 7212- 2	DC	R
CS 7218-11	W	O
CS 7227-37	W	R
CS72121- 4	W	O
CS 7306-12R	R	O
CS 7339-15	W	R
CS 7355- 3R	LR	O
CS 7368- 2	W	R (O)
CS73100-11	WC	R
CS73108- 3	irregular R, W	O
CS74141- 3	DC	RO
CS77118- 1	Re R	RO
DT 3063- 1Rd	Re	R
F 34011	W	O
F 55066	Pu	OL
F 56047	W	RO
F 59045	W	RO
F 59094	W	RO
F 67017	W	RO
F 67072	C	RO
F 67128	W!	O FL
F 68150	W	R
F 71059	W	R
FG 5736- 2	W	OL
- 3	Y	R
- 4	WY	R
- 5	W	R
- 8	LY	O FL
- 9	W	RO
-10	LY	RO
-11	Y	O FL
-12	B	OL
-15a	WC	RO
-15a	WC	RO
-15B	WC	RO FL

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
FG 5737- 2	W	R
FG 5738- 4	W	R
- 7	W	R
FG 5748- 8	W	RO
FG 5750- 1	W	R FL
- 3	WC	R
- 6	R	OL
- 7	DC	O
- 9	W	O
-10	C	RO
FG 5754- 2	WC	OL
- 4B	Spl	R
G 670-11	CN	R
G 678- 3Ra	R	R
G 694- 3Rd	Re	R
G 5280-267	W	RO
G 6652-37	WC	R
G 6666- 4Y	DC Pi	RO
G 6880- 1	W	R
G 68107-14	Y	R
G 7015- 5	W	R
G 7151-14Ru	B	R
K 219- 5	W	R
M 2-18	W	R
MN 2526	DR	OL
MN 3866	Re	R
MN 4858	Re	O
MN 7973	WC	O
MN 8586- Ru	R	OL
MN 9732	W	R
MP 1- 1	W	R
- 4	Y	R
-10	Y	R
-11	Y	R
-13	YN	R

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
MP 2- 1	YC	R
- 3	W	R
- 5	LY	R
- 6	Y	O
-15	LY	R
-18	Y	R
MP 4- 3	Y	R
- 5	C	R
-10	WN	R
-13	YC	R
-16	WN	O
-20	LY	R
-21	WC	RO
-26	WN	R
MP 6- 1	WY	R
- 3	BY	R
- 6	WC	R
- 9	WN	R
-11	WN	R
-13	WC	R
-15	LY	R
MP 74- 3	Y	R
- 4	Y	RO
MPI 49/ 6	WN	R
MPI 50/ 5	Y	R
MPI 55/54	Y	OL
MPI 74- 2(B)	Y	R
ND 137- 5R	W	R
ND 7103- 4	WN	R
ND 8742- 2	W	RO
ND 8750-20	W!	R
ND 8751-16	R	RO
NY 57	W	R
NY 61	W (spl)	R (O)
NY 62	W	R

Maine Table 2. continued

Pedigree	Color[1/]	Shape[2/]
USW 5276.1	W!	R
VT[3] 62-10-22	Y	O
W 718	W	OR
WC 230-14	LR	RO
WC 285-83	R	RO
WC 314- 2	R	RO
WS 681- 5	W	R
X 96-56	W	R
Y 62- 2-221	W	R
Y 66-13-636	WC	RO

1/ R = russet; W = white; B = buff; C = cream; Pu = purple; Re = red; Pi = pink; spl = splashed; D = dark; L = light; N = netted; y = yellow.

2/ R = round; L = long; O = oblong; fl = flat; pts = pointed ends.

MINNESOTA POTATO BREEDING PROGRAM

Florian Lauer, David Wildung, John Wiersma, Richard Veilleux, Daniel Goldman, Gerald Rau, Michael Burke and Richard Wenkel

Research Studies

The breeding behavior of yield components and hollow heart in tetraploid-diploid vs. conventionally derived potato hybrids was studied. Six tetraploid cultivars or breeding lines (Cherokee, Oneida, MN 8586, Norgold Russet, Bison and MN 8573) were crossed to 1) Four cultivars (Norland, Norchip, Shoshoni and Chieftain), 2) Four tetraploid high-protein selections (2636, 9731, 9732 and 9757) and 3) Eight diploid S. phureja selections (126-9, 127-7, 128-5, 128-7, 128-13, 128-24, 148-17 and 154-1). Twenty-four seedlings from each of the 96 crosses and their parent clones grown in the field at Becker, Minnesota and individual plant data taken.

The cultivar x diploid S. phureja hybrids were later maturing and had more and smaller tubers than the cultivar x cultivar hybrids. The cultivar x diploid S. phureja hybrids were higher yielding than cultivar x cultivar hybrids, and were almost equal to that of the cultivar clones themselves (Table 1). The cultivar x tetraploid high protein selection hybrids were intermediate between the other two hybrid groups except for characteristically low yield. The frequency of hollow heart was greatest in the cultivar x cultivar hybrids with Norgold Russet contributing most of the hollow heart.

Four of the diploid S. phureja parents in crosses with cultivars generated progeny with mean yield superior to the cultivar parents. The mean yield of these four hybrid progenies was 6.0 lbs./hill vs. 4.7 lbs./hill for the cultivar x cultivar progeny and 5.6 lbs./hill for the six tetraploid cultivars.

Minnesota Table 1. Population means for three types of hybrids populations.

	Cultivar x Cultivar	Cultivar x Tetraploid High Protein	Cultivar x Diploid S. phureja
Yield (lbs./hill)	5.1	4.7	5.5
Tuber set/hill	16.8	19.3	28.8
Tuber size (oz.)	5.1	4.3	3.3
Marketable yield (lbs./hill)	3.9	3.5	3.5
No. of marketable tubers	8.8	9.2	10.1
Marketable size (oz.)	8.0	6.5	5.9
Hollow heart[1]	15	10	9
Maturity[2]	2.8	2.9	4.0

[1]Percent of all plants with severe hollow heart symptoms.

[2]Scale, 1-5: 1 = early; 5 = late

Another study was made on the breeding behavior for tuber protein in S. tuberosum and tuberosum-phureja hybrids. Four tetraploid cultivars or breeding lines (Oneida, MN 8586, Bison and MN 8573) were crossed to three parents in each of four classes: 1) Tetraploid cultivars (Norland, Norchip, Chieftain), 2) Tetraploid high protein selections (9731, 9732 and 9757), diploid "low protein" S. phureja (126-9, 128-5 and 128-13) and diploid "high protein" S. phureja (128-24, 148-17 and 154-1). The material was grown at Becker, Minnesota. Twenty-one seedlings from each of the 48 crosses plus parents clones were analyzed for protein content.

To compare protein distribution among tuber, all tubers from a single plant of both 'Oneida' and 148-17 were processed and analyzed separately.

Although the "high protein" S. phureja male parents were approximately equal in protein content to the "high protein" tetraploid parents, transmission of the higher protein character to their progeny was obtained only with the tetraploid parents (Table 2). The population derived from the "high protein" tetraploid parents was significantly higher in protein content than the other three populations.

Minnesota Table 2. Mean true protein content on a dry weight basis for parent clones and their hybrid families.

	Male Parents			
Female Tetraploids Parents	Cultivars	"High-protein" Tetraploid Selections	"Low-protein" Diploid S. phureja	High-protein Diploid S. phureja
4.8	4.7	6.4	5.2	6.3
Population means	4.5	5.3	4.5	4.6

Even though there was a negative correlation between protein in content and tuber yield (up to -.39), identification of seedlings with moderately high protein content as well as respectable yield was possible in all four populations (Table 3).

Minnesota Table 3. Selections of seedlings in four hybrid populations with true protein in excess of 5.5 percent on a dry weight basis and high yield of 4.4 lbs. per hill.

	Cultivars crossed with			
	Cultivars	"High-protein" Tetraploid Selections	"Low-protein" Diploid S. phureja	High-protein Diploid S. phureja
No. of seedlings evaluated	252	251	251	252
No. of seedlings with 5.5% or more protein	15	74	27	13
No. of seedlings above with 4.4 lbs. or more yield	9	19	11	7
Range in yield in lbs. per hill	4.4-7.7	4.4-7.3	4.4-9.3	4.4-7.1

In comparing protein distribution among tubers, we found that protein content was consistently lower in larger tubers in the S. tuberosum cultivars. In the S. phureja seedlings, protein content in large and small tubers did not differ significantly in protein content. The unpredictable variation within clones of S. phureja make us doubt the legitimacy of high protein values in this species.

We also compared haulm and yield differences in Verticillium wilt resistant and susceptible clones. We collected Verticillium resistant breeding stocks from five different programs and evaluated them visually for resistance at Cambridge, Minnesota. We selected eight clones on the basis of pedigree, foliar maturity and resistance to Verticillium wilt. These were then planted in an infested plot at Cambridge, Minnesota and an infested and a noninfested plot at Becker, Minnesota. Observations were made of seven vine and four tuber characters.

Resistant clones had a lower percentage of their leaf dry matter comprising the total vine dry matter and a higher percentage of their leaf dry matter originating from lateral branches than in susceptible clones. When grown in infested soil, susceptible clones had smaller tuber size but both higher set and more undersized tubers than the resistant clones. Within infested plots, the size of the large tubers was greater in the resistant than in the susceptible clones, whereas in the noninfested plot they were not significantly different.

Grower Increase of Advanced Selections

In cooperation with the Minnesota Department of Agriculture, 11 selections were released to Foundation and Certified growers in 1979. Of these, nine selections are still in the program. In most instances, around 200 cwt. of seed are available for grower evaluation. A brief description follows:

Reds:

MN 4536: Parentage: ND4524-7 x ND4620-1

Foliage: Vigorous upright growth, early maturing.

Disease resistance: Resistant to late blight, intermediate scab resistance (not as resistant as Norland but more resistant than Red Pontiac).

Tuber color: Red, color is similar to Norland

Tuber characteristics: Blocky in shape, shallow eye, low solids, excellent cooking quality, does not chip.

Yielding ability: Yield is between Norland and Red Pontiac. Tubers size as early as Norland. Tubers will get large so reduced spacing would probably be helpful, especially in RRV.

This selection has performed well in RRV and as an early red on the irrigated sands. It is strictly a fresh market type.

Foundation stock: Henry Welberg

MN 8742: Parentage: MN32.63-9 x Norchief

Foliage: Vigorous vine, medium maturity.

Disease resistance: Intermediate resistance to scab (not as resistant as Norland but more resistant than Red Pontiac), high resistance to late blight.

Tuber color: Dark red

Tuber characteristics: Blocky in shape, shallow eye, intermediate solids, excellent cooking quality, does not chip.

Yielding ability: Higher than Norland but lower than Red Pontiac.

This selection does fairly well in the RRV and it has looked very good on the irrigated sands. It is strictly a fresh market type. It has a very vigorous vine and sizes up early.

Foundation stock: Paquin Brothers

Certified stock: Dagen Farm, Sherwood Peterson

MN 8757: Parentage: MN32.63-9 x Chieftain

Foliage: Large leafed, normal sized vine, medium late maturity.

Disease resistance: High resistance to scab and high resistance to late blight.

Tuber color: Red, color is similar to Norland.

Tuber characteristics: Blocky in shape, shallow eye, low solid, good cooking quality, does not chip.

Yielding ability: Yield is between Norland and Red Pontiac. Tuber will get very large, so reduced spacing would probably be helpful in reducing jumbos.

This selection can yield heavily. It has shown some promise in the RRV and in Hollandale. It is unacceptable on the irrigated sands because it gets a high degree of brown center. The selection is strictly a fresh market type.

Foundation stock: Jerry Pieper

Certified stock: Brian Halvorson, Veldman Brothers

MN 8758: Parentage: MN32.63-9 x Chieftain

Foliage: Normal sized vine, medium late maturity.

Disease resistance: High resistance to scab and high resistance to late blight.

Tuber color: Dark red

Tuber characteristics: Blocky in shape, shallow eye, intermediate solids, good cooking quality, does not chip.

Yielding ability: Yields like that or Norland.

This selection has excellent tuber shape and color in both the RRV and irrigated sands. It is strictly a fresh market type.

Foundation stock: Jerry Pieper

Certified stock: Earl Mallinger

Whites:

MN 7973: Parentage: Neb16.55-1 x MN1106.64-1

Foliage: More of a compact vine, medium maturity.

Disease resistance: High scab resistance and intermediate late blight resistance.

Tuber color: White-russet. In RRV this selection can have a russet skin at some locations.

Tuber characteristics: Long in shape, shallow eye, intermediate solids, excellent french fry and flake quality, good baking and cooking quality.

Yielding ability: Yield approaches but is not equal to Kennebec. Tubers size up early.

This selection produces large tubers early; therefore, it might have a use for start-up in french fry plants. It also appears to do well in the peat soils. Has excellent flaking quality.

Certified stock: Frank Thompson and Sons, Veldman Brothers

MN 9234: Parentage: B3692-4 x Atlantic

Foliage: Normal vine size with smaller leaves, medium late maturity.

Disease resistance: High resistance to scab and high resistance to late blight.

Tuber color: Bright white

Tuber characteristics: Round in shape, shallow eye, intermediate solids, good cooking quality, does not chip.

Yielding ability: Equal to Norchip.

This selection has shown some promise on peat soil. It is strictly a fresh market type.

Foundation stock: Jerry Pieper

Certified stock: Don Frederickson, Veldman Brothers

Russets:

MN 8586: Parentage: MN321.64-11 x 305.64-10

Foliage: More of a compact vine, medium maturity.

Disease resistance: Very high resistance to scab, low resistance to late blight.

Tuber color: A nice russet which is consistent across locations.

Tuber characteristics: Oval in shape, shallow eye, intermediate solids, has good cooking quality. This is an excellent chipper and is equal to Norchip in length of time it can be chipped.

Yielding ability: Low. It is lower than Norgold. This selection does not hollow, however.

This selection tends to have a heavy set with subsequent small tubers. Spacing, therefore, should be increased in comparison to other varieties and seed piece size reduced. MN8586 has performed quite well for yield in the southern end of the RRV. It could be used both fresh and chipped.

Certified stock: Kenneth Roland, Paquin Brothers

MN 9648: Parentage: MN366.65-3 x G6743-5

Foliage: Open vine, medium, late maturity.

Disease resistance: Very high resistance to scab and very high resistance to late blight.

Tuber color: Nice russet

Tuber characteristics: Fat-blocky in shape, shallow eye, intermediate solids, excellent baking and good cooking quality, marginal chipper.

Yielding ability: Similar to Norgold but not prone to hollow heart.

This selection could be grown in both the RRV and the irrigated sands. It would probably be more useful as a fresh market type. It looks excellent on the irrigated sands.

Foundation stock: Jerry Pieper, Henry Welberg

Certified stock: Keith Offutt

Replicated Yield Trials

Yield trials of advanced selections and new named varieties were conducted in the RRV at Grand Forks (Askim) and Baker (Preston), on nonirrigated sandy loam soil at Grand Rapids (Wildung), on irrigated sandy soil at Becker (Titrud), Big Lake (Klint) and Park Rapids (Preston), and on peat soil at Anoka (Klint). They were planted in 20 hill plots and replicated twice.

A total of 25 advanced selections and 10 new and standard varieties were included. Tabel 4 gives the results at two locations in the RRV and Table 5 gives the results at Becker on the irrigated sandy. Of the new selections entered into these trials for the first time, two appear to have promise. MN 10874 is a russet with very good tuber type that showed up good in all locations. The other is AC67650-1, a new dark red from Colorado which will be entered into the trials next year again.

Minnesota Table 4. REPLICATED YIELD TRIAL - 1981
Grand Forks and Baker

Variety	Color	Vigor[2]	Maturity[1,2]	Type[1,2]	Total Yield[3]	Marketable Yield[4]	Specific Gravity[5]	Shape	1980 GF6 Chipping 43F	1980 GF6 Chipping 65F
8757	Red	1.3	4.5	2.5	59.4	58.0	1.079	Blocky	20	24
Pontiac	Red	1.5	4.5	3.0	55.8	53.4	1.077	Blocky	16	24
8743	Light Red	2.3	3.0	3.0	53.1	49.2	1.078	Blocky	16	23
AC67560-1	Dark Red	2.3	3.0	2.0	49.6	47.3	1.082	Blocky	—	—
8742	Red	2.8	2.5	2.0	49.3	46.1	1.090	Blocky	20	23
Norchip	White	1.8	3.5	3.0	48.5	45.9	1.093	Round	47	34
Kennebec	White	1.8	5.0	4.0	47.0	45.4	1.084	Long	—	—
9234	White	1.8	5.5	2.5	47.0	42.9	1.085	Round	27	31
7973	White	2.0	4.0	2.0	44.2	42.5	1.083	Long	18	25
9648	Russet	1.5	3.5	2.0	43.1	42.1	1.087	Blocky	31	36
Norgold	Russet	1.8	3.0	2.0	43.4	41.5	1.081	Long	—	—
10874	Russet	1.8	4.0	1.5	43.3	40.9	1.087	Blocky	21	24
8777	Dark Red	1.8	5.0	1.0	43.4	40.6	1.085	Round	15	22
9885	White	2.0	3.5	2.5	42.4	40.1	1.090	Blocky	40	43
10504	Red	1.8	1.5	2.5	41.6	39.9	1.090	Blocky	32	35
10162	White	1.8	3.5	3.0	42.7	39.7	1.097	Long	43	51
10509	White	2.3	3.0	2.0	40.6	39.4	1.099	Blocky	30	40
10498	Red	1.5	2.5	3.0	40.3	39.2	1.080	Round	17	25
4536	Red	1.3	2.5	2.5	40.3	38.7	1.079	Blocky	19	24
8758	Red	2.3	3.5	1.0	38.6	38.3	1.085	Blocky	20	27
Crystal	White	2.0	4.0	2.0	39.5	37.3	1.081	Blocky	—	—
8224	White	1.5	4.0	3.0	39.5	36.7	1.094	Round	39	42
Norland	Red	1.7	2.0	3.0	36.8	35.8	1.080	Round	30	33
10876	Russet	1.8	2.5	2.5	36.2	35.5	1.082	Blocky	32	36
Burbank	Russet	2.0	5.0	4.0	37.5	34.7	1.088	Long	—	—
9569	Russet	2.3	2.5	3.0	36.5	34.3	1.083	Long	31	30
Lemhi	Russet	1.8	5.0	2.0	36.0	33.5	1.090	Long	—	—
11807	Russet	2.0	5.0	2.0	34.5	32.3	1.090	Blocky	40	40
9781	Russet	1.8	3.5	3.5	34.4	31.2	1.093	Long	32	34
10049	White	2.3	5.5	3.0	33.9	31.1	1.087	Long	37	29

Minnesota Table 4. Continued

Variety	Color	Vigor[2]	Maturity[1,2]	Type[1,2]	Total Yield[3]	Marketable Yield[4]	Specific Gravity[5]	Shape	1980 GF6 Chipping 43F	1980 GF6 Chipping 65F
9862	White	1.8	3.5	2.5	32.2	29.6	1.088	Blocky	34	42
8586	Russet	1.8	3.0	2.0	32.5	28.9	1.083	Blocky	42	40
10784	Russet	2.0	3.0	2.5	30.2	28.4	1.004	Blocky	44	40
Denali	White	2.3	4.0	2.0	28.3	26.8	1.084	Blocky	—	—
10267	Russet	1.8	5.0	2.0	29.0	26.4	1.084	Blocky	19	25

[1]Grand Forks - observations only.

[2]Scale, 1-5: 1, good; 5, poor

[3]20 hill plots

[4]LSD_{05} = 8.7

[5]LSD_{05} = .006

[6]Chip color values of 35 or more are acceptable

Cooperators: Dennis Askim, Grand Forks
Frank Thompson & Sons
Duane Preston, Baker

Minnesota Table 5. LATE HARVESTED REPLICATED YIELD TRIAL - 1981
Becker

Variety	Color	Vigor[1]	Type[1]	Total Yield[2]	Marketable Yield[3]	Specific Gravity	Shape
Pontiac	Red	1.0	3.0	100.5	98.3	1.070	Blocky
8777	Red	1.0	1.0	101.0	97.8	1.079	Round
8743	Light Red	1.0	3.0	95.8	93.0	1.066	Blocky
8758	Red	1.0	1.5	83.0	79.5	1.078	Blocky
Crystal	White	1.0	1.5	79.0	77.0	1.089	Blocky
Burbank	Russet	1.0	3.0	79.8	75.8	1.084	Long
9234	White	1.5	2.0	81.0	75.0	1.080	Round
AC67560-1	Dark Red	1.0	3.0	78.1	74.9	1.067	Blocky
Lemhi	Russet	1.0	2.0	77.3	73.5	1.085	Long
4536	Red	1.0	2.0	72.8	71.3	1.069	Blocky
Norgold	Russet	2.0	2.0	70.8	68.3	1.068	Long
9648	Russet	2.0	2.0	68.0	67.3	1.078	Blocky
8757	Red	2.0	2.0	68.8	66.3	1.073	Blocky
10049	White	1.0	2.5	67.4	65.1	1.085	Blocky
10162	White	2.0	3.0	67.6	64.8	1.078	Long
10874	Russet	1.5	1.0	67.0	64.8	1.079	Blocky
Kennebec	White	2.0	3.0	65.5	63.8	1.080	Long
Denali	White	1.0	2.5	64.5	63.5	1.094	Round
10509	White	2.5	2.0	63.3	62.0	1.078	Long
Norchip	White	2.0	3.0	60.3	58.8	1.084	Round
10267	Russet	2.0	1.5	60.3	58.8	1.084	Blocky
8742	Red	2.0	2.0	59.8	58.3	1.074	Blocky
10498	Red	2.0	2.5	56.8	56.0	1.069	Blocky
Norland	Red	1.0	1.0	54.5	52.8	1.065	Round
9781	Russet	2.0	2.5	55.0	52.0	1.086	Long
10504	Light Red	3.0	2.0	53.0	51.5	1.070	Blocky
10876	Russet	2.5	2.0	55.3	51.5	1.083	Blocky
7973	White	3.0	2.5	53.3	51.5	1.063	Long
8224	White	2.0	2.5	53.8	50.5	1.086	Round
9862	White	2.0	2.0	53.3	49.3	1.082	Long

Minnesota Table 5. Continued

Variety	Color	Vigor[1]	Type[1]	Total Yield[2]	Marketable Yield[3]	Specific Gravity	Shape
9885	White	3.0	2.5	49.8	47.3	1.080	Blocky
10784	Russet	3.0	2.0	50.5	47.2	1.076	Blocky
8586	Russet	2.5	2.0	45.8	38.3	1.075	Blocky
9569	Russet	3.0	2.5	40.0	37.5	1.072	Long
11807	Russet	3.0	2.0	40.0	34.0	1.088	Blocky

[1]Scale, 1-5: 1, good; 5, poor

[2]20 hill plots, 12" between hills, 36" between rows

[3]LSD_{05} = 15.4

Cooperator: Glenn Titrud
Planted: April 8, 1981
Harvested: August 27, 1981

Fertilization:
Preplant: 314 lbs/A 0-0-20
Starter: 1050 lbs/A 8-10-30 (banded)
Sidedress: May 27, 240 lbs/A 33-0-0
June 11, 240 lbs/A 33-0-0

NEBRASKA

R. B. O'Keefe, Eric D. Kerr, Arthur Hagen

Variety Screening Trials

Demonstration and replicated trials were continued at the Mesa Experiment Station (Dr. I. Pew, Dr. Paul Bessey) in Arizona in 1981 (Nebraska Table 1). The superior chipping selections were Crystal, Neb A129.69-1 and Belchip. Belchip was superior to Atlantic in total yield and yield of US #1 potatoes. Lemhi and Neb A71.72-1 exceeded Norgold Russet in yield and tuber size; Norgold was superior to Centennial. Minn 4536 was comparable to Red LaSoda in yield and quality.

Yield and quality of selections in the Scottsbluff, Nebraska 1981 trials are given in Nebraska Table 2. Wisc 726, New Haig, Atlantic and Crystal were the high yielding chipping selections with high specific gravity and good chip color. Wisc 729R (Rhinered), Dark Red Norland and Red LaSoda exceeded Norland in yield and quality. Lemhi was the only russet that exceeded Norgold in yield. Norgold 19 was superior to the other strains of Norgold in the trial. Neb A129.69-1, Neb 85.63-1 and WC 612-13 were highly tolerant to Early Blight.

Performance of Clonal Strains

Clonal strains of Monona and Norchip developed from stem cuttings were compared for differences in yield and quality (Nebraska Table 3). Monona 35 was the highest in yield but produced low specific gravity and a high percentage of oversize. Strains four and five were high yielding and of good grade quality and acceptable in specific gravity.

Norchip 30 was the outstanding strain in terms of yield, grade quality and specific gravity followed by strains 22 and nine.

Potatoes As An Energy Resource

The evaluation of potato selections as ethanol sources was continued for the second year. The effect of insect and disease control on yield and quality was included in the 1981 study. Weekly sprays with Cygon 400 plus Di-Syston at planting time was no more effective in controlling major insects than Di-Syston only plus one application of Cygon 400 applied late in the season. Weekly applications of Bravo retarded Early Blight development but had no apparent effect on yields. The major insects that were most prevalent in the "no control" plots were Potato Flea Beetle, Psyllid, Aphids, Leafhoppers and Lygus Bugs (Nebraska Table 4.) The number of insects in 50 sweeps was five times greater in the no control plots than in the control plots.

The yield and quality of potatoes harvested from the "complete" and "standard" control plots were comparable. Total yields were reduced 60 percent and US #1 yield was reduced by 55 percent in the "no control" plots (Nebraska Table 5). The selections A503-42, Wn 708-27, Onaway, Neb A158.70-1, Kennebec and Platte were least affected by the insect infestations. Crystal, ND 9403-16R, A 68113-4 and Wn 705-111 were the most susceptible to damage in terms of reductions in yield and quality. Ethanol is being produced from samples of each of 22 varieties and three treatments to determine the effect of insects on ethanol production.

Nebraska Table 1. Yield and quality of commercial varieties and potato advanced selections in Arizona 1981.

Selections 1/	Color	Yield Cwt/A	Yield US#1	Percentages US#1	Over 3-7/8 inch	Under 1-7/8 inch	Culls	Defects 2/
Crystal	W	279	163	58	20	1	20	GC,K
Neb 12.72-2	Rus	253	153	60	33	3	3	
Red LaSoda	R	237	170	72	16	5	7	GC
Minn 4536	R	226	141	62	27	2	9	GC
Neb A129.69-1	W	217	145	67	20	2	11	GC,HS
Belchip	W	216	153	71	14	1	14	GC
Neb 7.67-1	W	205	120	58	23	2	16	GC
Kennebec	W	200	185	93	1	4	2	
Norchip	W	189	142	74	13	4	7	GC
Lemhi	Rus	187	164	88	2	5	5	K
Neb 143.70-2	R	187	116	62	30	5	3	
Neb A71.72-1	Rus	157	107	68	22	7	3	Sml
Neb A219.70-3	W	154	86	56	19	3	22	HS
Minn 7973	W	148	100	68	23	3	6	
Atlantic	W	145	110	76	13	1	10	GC+
Oceania	W	139	92	66	23	1	9	
Norgold	Rus	127	110	87	0	10	3	HS
Denali	W	123	105	85	3	4	7	GC
Wisc 726	W	122	71	59	29	2	9	
Neb A63.71-1	Rus	99	66	66	23	3	7	GC
Centennial	Rus	86	55	64	0	21	15	Sml
Neb 102.71-2	Rus	71	54	75	3	12	10	

1/ Planted: January 7, 1981. 10" x 34"; 4 reps. of 20 hills.
Harvested: June 16, 1981.
1000 lbs/A 11-48-0 - 21bs/A. actual Thimet.

2/ Defects: GC = Growth Crack; K = Knobs; HS = Heat Sprouts; Sml = Small.

Nebraska Table 2. Yield and quality of potato selections, Scottsbluff, Neb. 1981.

Variety 1/	Color	Yield Cwt/A	Percentages US#1	Over 3-7/8	Under 1-7/8	Sort Out	Specific Gravity	Early Blight 2/	Chip Color 3/	Defects 4/
Denali	W	236	62	5	9	24	1.0978	2	2	Sc,GC,OT
Atlantic	W	281	71	5	9	14	1.0948	2	2	BE,K
Wisc 726	W	338	68	15	7	9	1.0815	4	2	SG,OT
Crystal	W	317	75	5	11	9	1.0815	3	2	BE,SG
Minn 7973	W	305	56	13	7	24	1.0738	3	3	BE,SG,OT
Belchip	W	194	55	12	9	24	1.0808	3	2	DB,OT,DAE
Norchip	W	278	69	0	17	14	1.082	3	2	SG,GC.Sc
A129.69-1	W	237	81	0	12	7	1.0765	1	3	SG,OT
Croatan	W	230	76	0	20	4	1.0698	4	2	OT,BE
Chipbelle	W	317	75	2	7	15	1.0913	2	2	SG,PE,OT
A9-72-1	W	215	71	3	13	13	1.080	4	2	OT
New Superior	W	228	64	4	8	23	1.0838	4	3	K,BE,OT
Monona	W	167	30	0	23	47	1.082	2	2	PE,K
New Haig	W	290	81	0	11	7	1.0795	2	2	SG,BE,DAE
Oceania	W	269	71	20	6	3	1.0713	4	2	SG
Minn 4536	R	243	68	0	7	25	1.067	5	3	PE,GC
Wisc 729R	R	341	75	2	7	16	1.0838	3	2	HC,BE,OB
A143.70-2	R	163	76	7	10	7	1.0735	4	3	GC,BE
85.63-1	R	242	72	0	18	10	1.0953	1	2	PE,DB
D. R. Norland	R	307	79	0	9	12	1.062	5	2	BE,OT
New D. R. Norland	R	231	71	0	12	17	1.0618	5	2	OB,BE
Norland	R	154	67	0	11	22	1.0658	5	2	OB,OT
Red LaSoda	R	344	73	4	3	19	1.0745	3	3	GC,K,BE
Red LaSoda #5	R	366	68	11	2	19	1.070	3	3	K,GC,BE
Lemhi	Rus	326	51	2	19	28	1.0883	4	2	PE,K,GG
A102.72-2	Rus	193	76	0	8	16	1.0655	3	3	GC,BE,Oval Sc.
Norgold	Rus	297	67	0	20	13	1.0715	3	3	PR,GC
A63.71-1	Rus	191	76	3	14	8	1.0778	2	3	PE,BE
Allagash	Rus	221	73	4	14	9	1.0663	5	2	OT,PE
A71.72-1	Rus	232	60	0	33	7	1.0825	3	2	OT,PE
A69.72-1	Rus	229	63	15	5	17	1.0808	2	3	PE,OT,GC
Norgold M	Rus	196	58	0	21	21	1.0695	3	3	BE,K,PE
Norgold 19	Rus	235	68	0	16	16	1.0758	2	4	K,PE,OT
Norgold 35	Rus	227	35	0	23	41	1.072	3	3	K,PE
WC 612-13	W	230	70	2	15	12	1.096	1	2	K,SG

1/ Planted: May 15, 1981; Harvested September 17, 1981.
Spacing 9" x 36"; 2 Replicates of 20 hills.

2/ PCII Chip Color 1 to 10; 1 to 4 acceptable; A = Original, B = 3 months at 50° F.

3/ Early Blight foliage damage; 1 = 10% to 25%; 3 = 25% to 50%; 5 = 75% to 100%.

4/ BE = Bulged Eye; SG = Sun Green; GC = Growth Crack; PE = Pointed Ends; K = Knobs; OB = Overbrown; OT = Off-Type.

Nebraska Table 3. Yield and grade quality of clonal selections from stem cuttings 1981.

Variety 1/	Clone	Yield Cwt/A	Percentages US#1	Over 3-7/8	Under 1-7/8	Sort Outs	Specific Gravity	Chip Color 2/	Defects 3/
Monona	4	325	75	2	2	21	1.078	3	SG,GC,K
	5	324	61	1	9	28	1.077	3	OT,SG,BE
	7	286	72	8	7	13	1.077	3	BE,K,OT
	17	204	56	14	8	21	1.072	3	BE,OT,K
	32	290	64	9	6	20	1.070	3	BE,K,SG
	35	349	75	11	6	7	1.069	2	BE,SG,GC
	37	232	66	7	8	19	1.074	3	SG,BE,K
	43	272	66	14	8	11	1.069	3	K,BE,PE
	45	263	62	13	6	19	1.071	3	K,BE,SG
	47	293	63	13	4	20	1.076	3	K,BE,SG
Norchip	4	361	52	12	6	30	1.079	3	GC,ROT,OT
	9	313	54	11	9	25	1.083	3	GC,BE,PE
	18	298	46	13	11	30	1.079	3	K,PE,BE
	22	263	44	2	20	34	1.085	2	K,BE,SG
	29	282	50	14	9	27	1.082	3	K,BE,ROT
	30	346	58	5	6	31	1.084	3	BE,K,ROT
	34	333	49	13	8	29	1.079	3	K,BE,OT
	41	231	46	18	4	33	1.090	3	SG,GC,K
	48	341	63	11	5	21	1.070	2	K,BE,PE

1/ Planted May 26, 1981; harvested September 18, 1981.
Spacing 9" x 36"; 4 Replicates of 20 - hills; fertilizer 100-100-0.

2/ PCII Chip Color 1 to 10; 1 to 4 acceptable.

3/ BE = Bulged Eye; SG = Sun Green; GC = Growth Crack; PE = Pointed Ends; K = Knobs; OB = Overbrown; OT = Off-Type.

Nebraska Table 4. Insect populations in potato ethanol plots Scottsbluff, Neb. 1981.

Insect	Control[2/] Complete	Standard	None
	(Ave. Counts/50 sweeps)[1/]		
Colorado Potato Beetle: Adults	2.89	12.0	23.33
Larvae	21.0	49.67	135.11
Potato Flea Beetle	5.11	3.78	129.67
Ladybird Beetle	1.0	0.22	8.89
Misc. Coleptera	1.56	1.44	5.11
Sarcophagidae (Fungus Fly)	0.33	1.22	14.67
Misc. Diptera	51.89	66.56	323.56
Potato Psyllid	3.67	5.78	117.44
Aphids	16.67	11.22	97.33
Potato Leafhopper	14.11	19.78	44.33
"Other" Leafhopper	5.89	4.33	23.56
Misc. Leafhopper	1.78	1.11	26.11
Lygus	6.56	8.33	111.11
Nabids	2.11	1.56	18.56
Misc. Hemiptera	1.11	0.56	2.67
Green Cloverworm	0.67	0.78	1.11
Misc. Lepidoptera	2.22	4.33	0.89
Parasitic Hymenoptera	12.89	11.33	17.56
Misc. Hymenoptera	4.55	6.67	13.11
Lacewings	0.56	0.22	3.67
Thrips	14.11	8.89	16.67
Misc. Orthoptera	0.0	0.0	0.11
Misc. Insects	0.44	0.67	1.78
Spiders	1.44	2.44	6.44
Totals	172.67	222.89	1142.9

1/ Sweeps made weekly from June 26 to August 13, 1981.

2/ Complete = Weekly spray with Cygon 400 plus Di-Syston at planting time;
Standard = Di-Syston at planting time plus foliar spray based on monitoring insects;
None = no insecticides used.

Nebraska Table 5. Effect of insect control on yield and quality, ethanol study 1981.

	Insect* Count	Total* Yield (CWT/A)	US#1*	Specific* Gravity
Complete control	173	228.6	37.0	1.0778
Standard control	223	215.0	37.4	1.0779
No control	1143	90.4	16.7	(Unobtainable)

*Average values for 24 varieties

Insect count = Weekly average number/50 sweeps.
Complete control = Systemic insecticide at time of planting plus weekly insecticide spraying.
Standard control = Systemic insecticide at time of planting.
No control = No systemic of spraying.

Nebraska Table 6. Effect of PSTV on yield and quality of potatoes grown in Arizona 1980.

Variety	Source	Total[1/] Yield cwt/A.	Percentage US#1	Percentage Sort Out	Percentage Under 1-7/8	Defects[3/]
Progress	SB	95	21	57	22	ST,GC
Progress	NWAL	238	67	12	21	GC
	PSTV[2/]	90	21	57	22	GC,ST
		-62%	-46%	+45%	+1%	
Saco	NWAL	134	67	21	11	K
	PSTV[2/]	79	47	43	10	GC,K,ST
		-41%	-20%	+22%	-1%	
Haig	NWAL	115	80	12	8	OT,BE
	PSTV[2/]	97	84	9	7	OT,BE
		-16%	+4%	-3%	-1%	

1/ 3 replicates of (10 ft x 2.83 ft).

2/ Inoculated with contaminated seed cutting knife; Progress SB infected tubers from 1980 fall crop were the source of contamination; effect of disease is shown as percent change in yield and grade factors.

3/ Defects: ST = spindle-tubers, GC = growth cracks, K = knobs, OT = Off-type, BE = bulged-eye

Effect of PSTV on Yield and Quality

The effect of PSTV on yield and quality of the three varieties is shown in Nebraska Table 6. The yields of Progress, Saco, and Haig were reduced by 62 percent, 41 percent and 16 percent, respectively by "first year" infection with PSTV. Sort-outs due to "spindle-tubers" and growth cracks were increased by 45 percent and 22 percent in Progress and Saco. Haig tubers were not deformed by PSTV. The size of normal tubers was not changed by infection of the plants.

Processing Studies

Samples of four standard potato varieties and 13 advanced selections were obtained from 12 locations in the North Central Region and Canada in 1980. The samples were analyzed for sucrose (SR rating), glucose and chip color within one month of harvest and three and six months of 50° F storage. Protein contents of tubers were also determined.

The relationship of sucrose content (SR rating) at harvest time to long-time chipability was studied for the fourth year. The average sucrose content of the cultivars ranged from 1.89 to 3.08 mg/g which was similar to the ranges in 1977 through 1979 (Nebraska Table 7). However the average color of chips after three and six months of storage in 1978, 1979 and 1980 was not correlated with average SR rating nor was SR rating correlated with vine maturity in any of the years. SR ratings were correlated with long-time storage chip colors in 1977. Glucose contents after long-time storage were not correlated with SR ratings nor vine maturity but were highly correlated with chip color after six months storage in all years with r-values ranging from 0.877 to 0.980.

Protein contents of tubers were comparable to previous years and ranged from 3.34 to 5.22 percent. Protein content was not correlated with SR rating or vine maturity in all of the years.

The average sucrose contents (SR ratings) of samples from various locations ranged from 1.01 to 6.30 mg/g and was comparable for previous years (Nebraska Table 8). Average chip color of samples after six months 50° F storage were correlated with average SR ratings ($r = 0.832$) at harvest and with glucose contents ($r = 0.975$). These results are in agreement with those of 1977 but not 1978 and 1979. Sucrose contents at harvest were not correlated with length of growing season in any of the years. Average protein contents of samples ranged from 3.63 to 5.14 percent. As in previous years, protein content was not correlated with length of growing season.

Eight cultivars were common to nine locations for three years and ten locations in two years (Nebraska Table 9).

Average values for vine maturity, sucrose content, chip color after one, three, and six months of storage and glucose and protein contents of tubers were highly correlated for individual cultivars (genotypes) in paired years except for sucrose content in 1977-1978. Correlations for locations (environments) were variable for pairs of years. The data indicate that the repeatability of genotypes over a wide range of environments was high among the years while environmental variation within specific locations over the years had a variable effect (interaction) on genotypes.

Nebraska Table 7. Chip color sugar and protein contents of potatoes in the NCS Trials 1980.

Selection	Vine Maturity	Sucrose (1)**	PCII* (1)**	PCII* (3)1/	PCII* (6)	Glucose (6)	Protein
		mg/g	Averages for 12 locations			(%)2/	(%)3/
Red Pontiac	3.9	3.08	6.4	7.6	8.0	0.81	4.50
NE A129.69-1	4.5	3.02	6.1	6.2	6.4	0.60	5.16
MN 8742	2.5	2.79	6.4	7.5	8.2	0.85	4.46
LA 42-38	3.8	2.62	6.1	6.5	6.8	0.59	4.89
AK 34-2	2.0	2.54	5.5	6.2	6.9	0.68	4.06
IND 14-1	2.1	2.28	5.0	6.5	7.4	0.67	5.22
NE A219.70-3	2.9	2.20	3.8	4.2	4.8	0.40	4.34
Rus Burbank	4.1	2.18	6.0	6.1	6.2	0.54	3.34
Norchip	3.1	2.17	4.0	4.6	4.3	0.28	4.70
Wisc 806R	3.3	2.12	5.9	7.6	8.8	0.91	4.70
MN 9319	2.8	2.09	4.2	4.9	5.8	0.46	3.64
MN 8757	2.9	2.07	6.2	8.2	8.6	0.94	3.73
NE A71.72-1	3.5	2.06	4.5	4.7	5.4	0.45	4.04
Wisc 723	3.3	2.05	3.9	4.7	5.4	0.35	4.62
Wisc 726	3.5	1.92	4.2	4.5	5.1	0.32	4.71
ND 146-4R	1.6	1.91	4.0	4.9	6.2	0.52	4.57
Norland	1.8	1.89	5.0	6.5	7.0	0.72	4.50
Mean:	3.0	2.29	5.1	5.9	6.5	0.59	4.42
Correlation with Sucrose:	0.418	----	0.668**	0.457	0.349	0.363	0.281

* PCII Chip Color = 1 to 10 scale.

** Number in parentheses = approximate number months after harvest.

1/ Treated with Fusarex.

2/ Correlation with Maturity = 0.144; correlation with PCII (6) = 0.980**

3/ Correlation with Maturity = 0.006.

Nebraska Table 8. Chip color sugar and protein contents of potatoes from various locations 1980.

Location	Days to Harvest	Sucrose (1)**	PCII* (1)**	PCII* (3)1/	PCII* (6)2/	Glucose (6)	Protein 3/
		mg/g	Averages for 17 selections			%	%
Kansas	124 (8/5)	6.3	4.6	5.9	8.9	0.91	4.84
Kentucky	155 (8/25)	3.5	4.2	5.6	7.8	0.81	3.63
Minnesota	132 (8/26)	3.2	4.2	4.9	6.8	0.59	4.56
Colorado	128 (9/9)	2.2	3.2	4.0	5.3	0.38	4.14
Alberta	155 (9/30)	2.0	4.3	5.4	6.6	0.53	4.22
Wisconsin	139 (9/22)	1.8	5.6	6.9	6.2	0.52	4.04
South Dakota	146 (9/22)	1.7	5.7	5.8	4.6	0.20	5.14
Michigan	141 (9/24)	1.6	3.8	6.1	6.3	0.47	4.99
Indiana	135 (9/24)	1.5	4.4	5.3	6.2	0.38	4.96
Manitoba	125 (9/16)	1.4	7.0	7.4	6.6	0.60	4.20
Nebraska	119 (9/16)	1.3	4.5	5.5	5.2	0.28	4.68
North Dakota	134 (9/22)	1.1	5.3	5.2	5.2	0.33	4.42
Means:	136	2.3	4.7	5.6	6.3	0.50	4.48
Correlation with Sucrose:	0.078	---	0.243	0.079	0.832**	0.811**	----

* PCII Chip color = 1 to 10 scale.

** Numbers in parentheses = approximate number of months after harvest.

1/ Treated with Fusarex.

2/ Correlation with glucose (%) = 0.975**.

3/ Correlation with Days to Harvest = 0.036.

The correlation of chip color with SR-values was significant for only one of the 12 environments (Kentucky). However, the correlation based on means of 17 genotypes was highly significant (r = 0.832). These results indicate that the use of the SR system is reliable for selecting a given genotype over a wide range for environments or cultural conditions in a given year. However, selection of genotypes for long-time chipability based on the SR system within an environment (single test) in a given year is not reliable.

Nebraska Table 9. Genotypic and environmental correlations (r) between pairs of years for characters measured in the NCS Trials.

	Genotypes[2]			Environments[3]		
Character	1977-78	1978-79	1979-80	1977-78	1978-79	1979-80
Vine Maturity	0.983**	0.989**	0.992**	------	-----	-----
Sucrose (SR)	0.131	0.780**	0.848**	0.393	0.209	0.795**
PCII (1)[1]	0.884**	0.939**	0.869**	0.715*	0.540	0.765**
PCII (3)	0.806**	0.840**	0.903**	0.069	0.477	0.456
PCII (6)	0.889**	0.930**	0.892**	0.462	0.288	0.210
Glucose (6)	0.636*	0.844**	0.921**	0.691*	0.891**	0.135
Protein (%)	0.983**	0.695**	0.807**	0.890**	0.937**	0.165
Number of Comparisons:	8	8	8	9	9	10

1/ Number in parentheses equal months after harvest and stored at 50°F.

2/ Includes the "standards" Norchip, Norland, Red Pontiac and Russet Burbank each year plus advanced selections common to pairs of years.

3/ The trials in Alberta, Manitoba, North Dakota, South Dakota, Wisconsin, Nebraska and Kansas are included in all years.

New Jersey 1981

Melvin R. Henninger

New Jersey Table 1. Key for the Irish Potato Trial Tables, 1981.

Location
- SJ = Rutgers Research & Development Center - Bridgeton
- VRF = Vegetables Research Farm near New Brunswick
- JB = Johnson Bros. Farm near Deerfield
- EM = Edgar Maghan Jr. Farm near Freehold
- wh = Round white types
- rus = Russet types
- Adv = Advanced Seedlings and newer varieties.

Market = Yield Over 1 7/8"
cwt = Hundred Weight per Acre
mt/h = Metric Tons per Acre
Total = Total Yield
SG = Specific Gravity (add 1.0 to each value)

PERCENT TUBER SIZES

Round Whites	Russets
A = Over 1 7/8"	A = Over 4 oz
B = Over 2 1/2"	
1 = Under 1 7/8"	1 = Under 4 oz
2 = 1 7/8" to 2 1/2"	2 = 4 to 10 oz
3 = 2 1/2" to 3 1/4"	3 = 10 to 16 oz
4 = 3 1/4" to 4"	4 = Over 16 oz
5 = Over 4"	5 = Culls

Vine Mat = Vine Maturity
- v-e = Very Early
- early = Early
- e-med = Early to Medium
- med = Medium
- m-late = Medium to Late
- late = Late
- v-lat = Very Late

Tuber Color
- white
- buff
- tan
- brown
- red

Tuber Text = Tuber Texture
- v sm = Very Smooth
- sm = Smooth
- s net = Slight Net
- net = Net
- l rus = Light Russet
- m rus = Moderate Russet
- h rus = Heavy Russet

Tuber Shape
- round = round
- rd-ob = round to oblong
- obl = oblong
- obl-l = oblong to long
- long = long

Tuber Conf = Tuber Conformation
Chip Color and Overall (all 3 on same scale)
- excel = excellent
- good = good
- fair = fair
- poor = poor

Tuber Defects
- SG = Second Growth
- GC = Growth Cracks
- HH = Hollow Heart
- ID = Internal Discoloration

Defects Rating
- ++ = none
- + = slight
- - = moderate
- -- = severe

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E	R Conf	Defects SG	GC	HH	ID	Over all	Chip Color
SJ-wh	B8599- 42	247	27.7	275	-	89	33	11	56	31	2	0	med	buff	s net	round	good		++	++	++	-	good	poor
VRF-adv	B8599- 42	268	30.0	307	66	87	38	13	49	30	8	0	late	buff	sm	round	good		+	+	+	+	good	good
SJ-wh	B8615- 2	434	48.6	473	-	91	48	9	43	39	10	0	med	buff	s net	obl	good		+	+	+	++	good	fair
VRF-adv	B8615- 2	236	26.4	269	77	87	39	13	48	29	9	0	m-late	buff	s net	round	good		+	+	+	+	good	excel
SJ-wh	B8706- 7	165	18.4	181	-	91	37	9	53	29	8	0	e-med	white	sm	round	good		++	++	+	++	good	
SJ-wh	B8706- 7	390	43.7	407	-	96	68	4	28	45	23	0	med	white	sm	rd-ob	good		++	++	+	++	good	fair
VRF-adv	B8706- 7	234	26.2	268	62	87	41	13	46	31	10	0	med	buff	s net	round	fair		+	++	+	++	good	fair
SJ-wh	B8706- 8	304	34.1	305	-	99	77	0	23	62	15	0	med	buff	sm	rd-ob	good		++	++	++	+	good	good
SJ-wh	B8706- 10	274	30.7	332	-	83	33	17	50	28	5	0	late	buff	s net	round	good		+	++	-	+	good	
SJ-wh	B8706- 11	236	26.5	255	-	93	46	7	46	42	4	0	late	buff	sm	round	good		++	++	-	++	good	poor
SJ-wh	B8706- 14	343	38.4	360	-	95	63	5	32	55	8	0	med	buff	s net	round	good		++	++	++	++	good	fair
SJ-wh	B8706- 15	269	30.2	278	-	97	61	3	36	46	15	0	e-med	buff	sm	rd-ob	good		++	++	+	++	good	excel
SJ-wh	B8710- 16	279	31.3	301	-	93	53	7	40	39	14	0	early	white	sm	rd-ob	fair		+	+	--	+	fair	
VRF-wh	B8710- 16	341	38.2	389	65	88	50	12	38	41	10	0	m-late	white	sm	round	good		-	++	+	++	good	poor
SJ-wh	B8724- 2	384	43.0	426	-	90	33	10	57	31	2	0	early	buff	sm	obl-l	fair		++	-	++	+	fair	
VRF-wh	B8724- 2	305	34.2	338	71	90	56	10	34	37	20	0	m-late	buff	sm	obl	fair		+	+	++	-	poor	
SJ-wh	B8742- 10	238	26.7	249	-	96	44	4	52	41	3	0	early	white	sm	obl	fair		+	+	++	-	good	
SJ-wh	B8798- 20	394	44.2	406	-	97	67	3	31	54	13	0	e-med	white	sm	rd-ob	good		+	++	+	++	good	excel
VRF-adv	B8798- 20	238	26.6	268	66	89	38	11	51	30	6	1	m-late	white	sm	round	fair		-	++	+	++	fair	
SJ-wh	B8799- 13	350	39.3	379	-	92	35	8	57	33	3	0	e-med	white	s net	round	good		++	++	-	++	good	excel
VRF-wh	B8799- 13	392	43.9	424	76	92	56	8	37	44	12	0	m-late	buff	sm	rd-ob	fair		-	++	++	++	fair	poor
SJ-wh	B9127- 6	451	50.5	469	-	96	62	4	33	38	24	1	m-late	white	sm	obl	good		++	-	+	++	good	poor
VRF-adv	B9127- 6	413	46.3	441	52	94	70	6	23	36	34	1	m-late	buff	sm	rd-ob	fair		-	+	++	++	fair	poor
SJ-wh	B9140- 4	345	38.6	373	-	92	28	8	65	28	0	0	early	buff	net	rd-ob	good		++	+	+	++	good	fair
VRF-adv	B9140- 4	317	35.5	353	75	90	33	10	57	29	3	0	e-med	buff	s net	rd-ob	good		+	++	+	+	good	fair
SJ-wh	B9140- 32	339	38.0	354	-	96	39	4	57	38	1	0	early	buff	net	round	good		++	++	+	+	good	
VRF-adv	B9140- 32	250	28.1	274	75	91	49	9	42	36	13	0	med	buff	net	round	good		+	+	+	-	good	excel
SJ-wh	B9192- 1	376	42.1	388	-	97	80	3	17	30	43	7	late	buff	sm	round	good		++	++	++	++	good	excel
SJ-wh	B9224- 6	340	38.1	369	-	92	39	8	53	32	7	0	v-e	buff	sm	round	good		++	++	++	++	exce	fair
VRF-adv	B9224- 6	278	31.2	321	65	87	41	13	46	31	9	0	m-late	buff	sm	round	good		+	++	++	++	exce	poor
SJ-wh	B9286- 4	274	30.7	308	-	89	40	11	49	35	4	0	med	white	sm	round	good		+	++	++	++	good	poor
VRF-wh	B9286- 4	393	44.1	461	60	85	40	15	45	34	6	0	med	white	sm	round	good		-	++	++	++	fair	poor

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E	R Conf	Defects SG	GC	HH	ID	Overall	Chip Color
SJ-wh	B9335- 35	297	33.3	336	-	88	24	12	64	24	0	0	e-med	white	sm	obl		good	++	++	-	++	good	
VRF-wh	B9335- 35	357	40.0	433	80	82	20	18	62	19	1	0	m-late	white	sm	round		fair	+	+	++	++	fair	fair
SJ-wh	B9335- 60	357	40.0	388	-	92	44	8	48	36	7	0	m-late	buff	s net	obl		good	++	-	+	+	good	poor
VRF-wh	B9335- 60	316	35.4	349	71	90	40	10	50	27	14	0	early	white	sm	round		good	++	++	++	++	good	poor
SJ-wh	B9336- 24	304	34.1	326	-	93	46	7	47	43	2	0	e-med	white	sm	round		good	++	++	+	+	good	fair
VRF-wh	B9336- 24	450	50.4	498	71	89	52	11	38	46	6	0	m-late	white	sm	round		fair	-	++	++	+	fair	poor
SJ-wh	B9336- 27	321	36.0	332	-	97	27	3	70	27	0	0	late	white	sm	long		good	++	+	+	++	good	good
VRF-wh	B9336- 27	315	35.3	355	79	89	39	11	50	39	0	0	late	white	sm	round		good	+	++	++	++	good	poor
SJ-wh	B9340- 7	282	31.6	293	-	96	66	4	30	47	19	0	med	white	sm	round		good	++	++	+	++	good	good
VRF-wh	B9340- 7	365	40.9	373	73	98	78	2	20	39	38	0	m-late	white	sm	round		good	+	++	+	++	good	fair
SJ-wh	B9340- 13	294	32.9	320	-	91	26	9	66	26	0	0	v-e	white	sm	obl		good	++	++	-	++	good	fair
VRF-wh	B9340- 13	327	36.7	355	75	92	29	8	63	27	2	0	med	buff	sm	rd-ob		good	+	+	+	++	good	poor
SJ-wh	B9384- 4	198	22.2	221	-	89	28	11	61	28	0	0	v-e	buff	sm	round		good	++	++	++	+	good	excel
VRF-wh	B9384- 4	181	20.3	244	65	75	15	25	60	13	2	0	e-med	white	sm	rd-ob		good	+	++	++	+	good	excel
SJ-wh	B9384- 6	338	37.9	342	-	99	71	1	28	50	21	0	early	buff	sm	round		good	++	+	++	+	good	fair
VRF-wh	B9384- 6	409	45.9	416	68	98	79	2	19	39	39	1	med	white	sm	round		good	++	++	+	++	exce	fair
SJ-wh	B9423- 4	405	45.4	452	-	89	47	11	42	43	4	0	early	white	sm	obl		poor	+	-	-	++	good	
VRF-wh	B9423- 4	469	52.6	508	63	92	54	8	39	37	17	0	med	buff	sm	round		good	+	++	++	++	fair	fair
SJ-wh	B9468- 1	334	37.4	367	-	91	25	9	66	23	2	0	e-med	buff	sm	rd-ob		fair	+	++	++	+	fair	
SJ-wh	B9510- 5	352	39.5	363	-	97	60	3	37	49	11	0	med	white	sm	obl		good	++	+	++	++	good	excel
SJ-wh	B9510- 17	275	30.8	309	-	89	34	11	55	26	8	0	late	white	v sm	rd-ob		fair	++	++	++	+	fair	
SJ-wh	B9511- 1	155	17.4	181	-	86	27	14	59	21	5	0	med	white	sm	obl		poor	-	-	+	+	fair	
SJ-wh	B9514- 38	437	48.9	456	-	96	75	4	21	60	15	0	e-med	white	v sm	round		good	+	++	+	++	good	
SJ-wh	B9531- 8	194	21.7	220	-	88	23	12	65	23	0	0	e-med	buff	s net	round		good	++	++	++	+	fair	
SJ-wh	B9533- 28	280	31.4	289	-	97	56	3	41	44	11	0	med	white	sm	round		fair	+	++	+	-	fair	
SJ-wh	B9536- 8	344	38.5	356	-	96	71	4	26	49	22	0	late	white	sm	round		fair	++	++	++	++	good	good
SJ-wh	B9541- 20	291	32.7	306	-	95	59	5	36	50	9	0	e-med	buff	sm	rd-ob		good	++	+	++	++	good	good
SJ-wh	B9541- 27	198	22.2	217	-	92	24	8	67	24	0	0	late	buff	net	round		good	++	++	+	-	good	
SJ-wh	B9541- 44	151	16.9	167	-	90	25	10	65	25	0	0	early	buff	net	round		good	++	++	++	++	good	
SJ-wh	B9541- 45	197	22.1	207	-	95	46	5	50	41	5	0	early	tan	s net	round		good	++	++	+	++	good	excel
SJ-wh	B9555- 13	78	8.8	123	-	64	2	36	62	2	0	0	med	white	sm	round		fair	++	++			fair	
SJ-wh	B9555- 21	299	33.5	333	-	90	21	10	69	21	0	0	m-late	white	sm	obl		fair	++	-	++	++	fair	

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E	R Conf	Defects SG	GC	HH	ID	Over all	Chip Color
SJ-wh	B9572- 8	211	23.7	240	-	88	33	12	54	33	0	0	v-e	buff	sm	round		fair	++	-	-	++	fair	
SJ-wh	B9572- 11	225	25.2	248	-	91	34	9	57	29	5	0	v-e	white	sm	round		good	++	++	++	++	good	good
SJ-wh	B9581- 9	120	13.5	178	-	67	0	33	67	0	0	0	early	buff	sm	obl		good	++	++	++	++	good	
SJ-wh	B9581- 10	416	46.7	424	-	98	66	2	32	56	10	0	late	buff	sm	round		good	+	++	+	++	good	fair
SJ-wh	B9582- 18	278	31.1	301	-	92	23	8	69	22	1	0	med	buff	sm	rd-ob		good	++	+	+	++	good	poor
SJ-wh	B9594- 4	360	40.4	405	-	89	21	11	68	15	6	0	early	white	sm	obl		fair	+	++	++	++	good	poor
SJ-wh	B9607- 3	426	47.7	445	-	96	52	4	44	46	6	0	early	tan	sm	rd-ob		good	++	++	-	++	good	fair
SJ-wh	B9612- 4	340	38.1	354	-	96	67	4	29	54	13	0	v-e	white	sm	round		good	++	++	+	++	good	poor
SJ-wh	B9641- 1	244	27.3	270	-	90	40	10	50	39	1	0	early	white	sm	rd-ob		good	-	++	-	++	good	
VRF-wh	ATLANTIC	369	41.4	404	77	91	45	9	46	32	14	0	m-late	buff	sm	round		good	+	++	-	--	poor	fair
VRF-adv	ATLANTIC	208	23.3	236	72	88	42	12	47	32	10	0	m-late	buff	sm	round		good	+	++	+	-	poor	good
JB-adv	ATLANTIC	338	37.9	368	82	92	58	8	34	39	19	0	m-late	buff	s net	round		good	-	++	-	-	good	
SJ-wh	BELCHIP	418	46.9	427	-	98	74	2	24	56	18	0	m-late	white	sm	round		fair	+	++	--	++	fair	good
VRF-wh	BELCHIP	376	42.2	405	65	93	70	7	23	34	33	3	m-late	white	sm	rd-ob		fair	+	++	-	++	fair	good
VRF-adv	BELCHIP	399	44.7	413	69	97	81	3	16	38	39	3	m-late	white	sm	rd-ob		fair	+	++	+	+	fair	fair
JB-adv	BELCHIP	345	38.7	365	69	95	64	5	30	42	22	0	m-late	white	sm	rd-ob		fair	-	++	+	++	fair	
SJ-wh	CAMPELL-11	335	37.5	341	-	98	71	2	27	64	7	0	med	buff	sm	round		good	++	++	+	++	good	good
VRF-adv	CAMPBEL-11	319	35.7	330	71	97	75	3	22	42	31	2	m-late	buff	sm	round		good	+	+	-	+	good	good
SJ-wh	CHIPBELLE	219	24.5	252	-	87	21	13	67	19	1	0	early	buff	sm	obl-l		fair	++	++	--	++	fair	good
VRF-wh	CHIPBELLE	284	31.8	326	78	87	30	13	57	26	4	0	m-late	white	sm	obl		good	+	++	++	++	good	good
VRF-adv	CHIPBELLE	208	23.3	247	78	85	29	15	55	24	5	0	m-late	white	sm	obl		fair	+	++	++	++	good	good
JB-adv	CHIPBELLE	340	38.1	368	82	92	55	8	37	40	16	0	m-late	white	sm	rd-ob		fair	++	++	+	++	good	
SJ-wh	DAKCHIP	323	36.2	342	-	95	53	5	41	46	7	0	med	white	sm	round		good	+	+	++	+	good	good
VRF-adv	DAKCHIP	367	41.2	420	61	87	37	13	50	32	5	0	late	white	sm	round		fair	--	++	++	+	fair	good
SJ-wh	DENALI	322	36.1	358	-	90	31	10	59	27	4	0	late	buff	sm	rd-ob		good	++	++	--	+	fair	
SJ-wh	DENALI	264	29.6	282	-	94	48	6	46	42	6	0	m-late	white	sm	round		good	+	++	--	++	good	fair
VRF-adv	DENALI	309	34.6	347	81	89	51	11	38	37	14	0	late	white	sm	rd-ob		fair	-	+	++	+	good	fair
JB-adv	DENALI	289	32.4	322	88	90	45	10	45	35	10	0	late	white	sm	round		good	-	+	+	++	good	
SJ-wh	JEMSEQ	203	22.8	217	-	94	40	6	54	37	3	0	early	buff	s net	round		good	++	++	++	++	good	poor
JB-adv	JEMSEQ	333	37.4	358	68	93	57	7	36	43	14	0	early	white	sm	rd-ob		good	+	+	+	++	fair	
SJ-wh	KATAHDIN	299	33.5	333	-	90	43	10	47	41	2	0	late	white	v sm	round		good	++	++	++	+	good	
SJ-wh	KATAHDIN	312	34.9	326	-	95	51	5	44	34	17	0	late	white	sm	round		good	++	+	+	+	good	

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E	R Conf	Defects SG	GC	HH	ID	Over all	Chip Color
VRF-adv	KATAHDIN	261	29.2	283	55	92	64	8	28	32	30	2	late	white	sm	round		good	+	+	+	+	good	
JB-adv	KATAHDIN	345	38.7	365	56	95	71	5	24	38	29	4	late	white	v sm	round		good	+	++	++	+	good	
SJ-wh	MICHIBONE	369	41.3	379	-	97	53	3	44	40	13	0	med	white	sm	rd-ob		good	+	+	++	++	good	
JB-adv	MICHIBONE	323	36.2	338	67	95	74	5	21	52	22	0	m-late	white	sm	round		good	++	++	++	+	good	
SJ-wh	MICHIMAC	199	22.4	241	-	83	28	17	55	25	2	0	late	white	sm	round		good	++	++	++	+	good	poor
JB-adv	MICHIMAC	330	37.0	354	58	93	61	7	32	41	20	0	m-late	white	v sm	round		fair	+	+	++	++	fair	
SJ-wh	NORCHIP	265	29.7	293	-	90	36	10	54	31	6	0	m-late	white	sm	round		good	+	++	+	-	good	fair
SJ-wh	NORCHIP	353	39.6	372	-	95	54	5	41	41	14	0	m-late	white	sm	round		good	+	+	+	-	fair	
VRF-adv	NORCHIP	312	35.0	389	70	80	22	20	59	19	2	0	m-late	white	v sm	round		fair	-	-	++	+	fair	good
JB-adv	NORCHIP	285	32.0	325	73	88	32	12	56	28	4	0	e-med	white	sm	round		fair	+	++	++	-	fair	
SJ-wh	OCEANIA	272	30.4	279	-	97	61	3	37	52	9	0	early	white	v sm	round		good	+	++	+	+	good	
VRF-wh	OCEANIA	425	47.6	446	69	95	61	5	34	46	16	0	m-late	white	sm	round		good	+	++	++	++	good	good
VRF-adv	OCEANIA	291	32.6	311	63	93	63	7	30	38	25	0	m-late	white	sm	round		good	++	++	++	++	good	good
SJ-wh	ROSA	287	32.1	315	-	91	32	9	59	32	0	0	med	white	sm	round		fair	++	++	-	++	good	excel
JB-adv	ROSA	329	36.9	372	71	88	44	12	44	38	6	0	m-late	white	sm	round		good	+	++	++	++	good	
SJ-wh	SHEPODY	263	29.5	300	-	88	24	12	64	24	0	0	e-med	white	sm	long		fair	-	-	++	++	fair	
JB-adv	SHEPODY	230	25.7	257	73	89	38	11	51	35	3	0	e-med	white	sm	obl		fair	+	++	+	++	fair	
SJ-wh	SUPERIOR	316	35.4	336	-	94	57	6	37	42	14	0	med	buff	sm	obl		good	++	++	++	-	good	poor
SJ-wh	SUPERIOR	378	42.4	393	-	96	57	4	40	50	7	0	med	buff	sm	obl		good	+	+	++	+	good	
VRF-wh	SUPERIOR	360	40.4	402	70	90	34	10	55	29	5	0	m-late	white	s net	obl		fair	+	++	++	++	good	poor
VRF-adv	SUPERIOR	349	39.1	363	63	96	66	4	30	41	25	0	med	buff	sm	obl		fair	+	+	++	+	fair	fair
JB-adv	SUPERIOR	289	32.4	309	71	93	48	7	45	44	4	0	e-med	buff	s net	rd-ob		good	+	++	++	+	good	
EM-rus	SUPERIOR	364	40.8	369	67	99	65	1	33	52	14	0	v-e	buff	sm	rd-ob		good	+	+	++	++	good	
SJ-wh	TRENT	407	45.6	446	-	91	35	9	57	28	7	0	m-late	white	sm	rd-ob		fair	+	+	--	++	good	
VRF-adv	TRENT	282	31.6	316	82	89	43	11	47	38	5	0	m-late	white	sm	rd-ob		fair	-	+	+	++	fair	
JB-adv	AF092- 3	393	44.1	413	70	95	53	5	42	40	13	0	e-med	white	sm	obl		fair	+	-	++	++	fair	
JB-adv	AF201-25	299	33.5	324	71	92	58	8	34	33	25	0	late	white	sm	rd-ob		fair	--	++	++	++	fair	
JB-adv	AF222- 1	192	21.5	217	79	86	37	14	49	36	1	0	early	white	sm	round		good	+	+	+	++	good	
JB-adv	AF238-21	375	42.0	397	72	95	63	5	31	38	24	1	early	white	sm	rd-ob		fair	+	--	++	-	fair	
JB-adv	AF238-66	235	26.4	273	75	86	27	14	59	25	2	0	e-med	white	sm	obl		fair	++	++	++	++	fair	
JB-adv	AF303- 5	245	27.5	270	76	91	46	9	45	35	11	0	late	white	s net	round		good	++	++	+	+	fair	
JB-adv	AF307- 5	367	41.1	382	66	96	71	4	25	42	28	2	e-med	white	v sm	rd-ob		fair	+	++	++	++	good	

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E Shape	R Conf	Defects SG	GC	HH	ID	Over all	Chip Color
JB-adv	AF324- 1	285	32.0	303	75	94	69	6	25	43	23	3	early	white	sm	round		fair	-	+	++	++	good	
JB-adv	AF330- 1	376	42.1	400	75	94	64	6	30	48	17	0	med	buff	sm	round		good	+	-	++	++	good	
JB-adv	B 6043WV 6	235	26.3	277	67	85	33	15	52	30	3	0	late	white	sm	round		fair	-	++	+	-	fair	
JB-adv	BR5991WV16	388	43.5	427	80	91	55	9	36	39	16	0	late	white	sm	round		fair	--	+	++	+	fair	
SJ-wh	CF74135- 3	294	32.9	319	-	92	37	8	55	32	5	0	e-med	buff	sm	rd-ob		good	++	++	++	++	good	good
SJ-wh	CF75023- 1	433	48.5	491	-	88	30	12	58	29	1	0	late	white	v sm	round		good	+	++	++	+	good	poor
JB-adv	CF75023- 1	391	43.8	444	70	88	45	12	43	39	5	0	m-late	white	v sm	round		fair	-	+	+	+	fair	
SJ-wh	F69026	225	25.2	258	-	87	22	13	64	22	0	0	e-med	purp	sm	obl-l		fair	-	++	++	++	fair	
JB-adv	F69026	339	38.0	370	66	92	49	8	43	37	12	0	early	purp	sm	obl		good	+	+	+	++	good	
JB-adv	F73008	351	39.4	389	64	90	57	10	33	39	18	0	late	white	sm	round		fair	--	-	++	++	poor	
SJ-wh	G712-1	194	21.7	209	-	93	53	7	39	38	15	0	early	buff	sm	round		good	++	++	+	++	good	
JB-adv	G712-1	313	35.1	349	72	90	46	10	44	30	15	0	early	white	sm	rd-ob		good	++	-	+	+	fair	
VRF-adv	NY-59	226	25.3	257	45	88	56	12	32	39	17	0	late	white	sm	round		fair	-	++	++	--	poor	poor
VRF-adv	NY-63	226	25.3	249	53	90	64	10	26	33	31	1	late	white	sm	round		good	+	++	++	-	poor	poor
SJ-wh	NY-67	311	34.8	331	-	94	52	6	42	41	11	0	late	white	v sm	round		good	+	++	++	+	good	
VRF-adv	NY-67	168	18.8	194	56	86	44	14	42	33	11	1	late	white	v sm	round		good	+	+	+	+	fair	
SJ-wh	NY-68	451	50.6	467	-	97	62	3	35	46	16	0	early	white	sm	round		good	++	++	++	++	good	poor
VRF-adv	NY-68	413	46.3	437	66	94	70	6	25	45	24	0	late	white	v sm	rd-ob		good	+	++	++	+	good	poor
SJ-wh	P0021-4	387	43.3	418	-	92	49	8	43	43	6	0	early	white	sm	round		good	++	++	+	--	poor	
SJ-wh	P0035-1	355	39.8	371	-	96	62	4	34	52	10	0	late	white	v sm	round		fair	++	++	++	++	good	poor
SJ-wh	S377- 8	310	34.7	332	-	93	35	7	58	29	7	0	late	tan	s net	round		excel	++	++	+	++	good	poor
VRF-adv	S377- 8	272	30.5	328	59	83	26	17	57	22	4	0	m-late	buff	sm	round		good	+	++	++	++	good	fair
SJ-wh	S377-41	450	50.5	505	-	89	26	11	63	26	1	0	late	tan	sm	rd-ob		fair	++	++	++	+	fair	
VRF-adv	S377-41	195	21.8	273	61	70	15	30	55	14	1	0	m-late	white	v sm	obl-l		fair	+	+	++	+	poor	
SJ-wh	WIS 718	297	33.3	321	-	92	57	8	36	43	14	0	late	white	sm	round		good	++	++	++		good	good
JB-adv	WIS 718	388	43.4	410	69	94	70	6	25	35	34	1	late	white	sm	rd-ob		good	+	++	++		good	
SJ-wh	9AM-3	331	37.1	342	-	97	58	3	39	48	11	0	v-e	white	sm	round		good	++	++	+	++	good	good
SJ-wh	9BJ-2	413	46.3	435	-	94	67	6	27	39	28	0	e-med	white	sm	round		good	++	++	+	-	poor	
SJ-wh	9GE-1	309	34.6	328	-	94	50	6	44	39	11	0	m-late	white	v sm	rd-ob		good	++	++	-	++	good	good
SJ-wh	9GE-1	287	32.1	320	-	89	30	11	59	29	2	0	e-med	white	sm	round		good	+	++	++	++	good	
SJ-wh	9HB-2	423	47.4	451	-	94	54	6	40	45	9	0	late	white	sm	obl		fair	++	-	--	++	poor	fair
SJ-wh	9II-1	357	40.0	364	-	98	56	2	42	48	8	0	e-med	buff	s net	round		good	++	++	++	+	good	good
SJ-wh	9LE-3	395	44.3	410	-	96	67	4	30	51	16	0	v-e	white	sm	round		good	++	++	++	+	good	poor
SJ-wh	9LV-2	340	38.1	369	-	92	60	8	32	51	10	0	m-late	white	v sm	round		good	++	+	++	+	good	fair

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E Conf	R	Defects SG	GC	HH	ID	Overall	Chip Color
SJ-rus	B8686- 8	149	16.7	188	-	79	-	21	58	22	0	0	v-e	buff	s net	long	fair		-	++	+	+	fair	
VRF-rus	B8686- 8	162	18.1	313	63	52	-	16	37	15	0	33	med	brown	m rus	obl-l	poor		--	+	++	++	poor	
SJ-rus	B8833- 6	123	13.8	165	-	72	-	0	50	22	0	28	v-e	buff	l rus	obl	fair		+	+	++	++	good	
EM-rus	B8833- 6	175	19.6	194	64	90	-	10	87	4	0	0	v-e	buff	net	long	fair		-	-	++	++	fair	
VRF-rus	B8934- 4	145	16.3	264	81	55	-	21	48	7	0	24	m-late	brown	l rus	obl-l	fair		+	++	+	++	fair	
EM-rus	B8934- 4	284	31.9	289	71	98	-	2	36	51	11	0	v-e	brown	net	obl	good		+	+	+	+	good	
SJ-rus	B8943- 4	191	21.4	216	-	88	-	0	67	22	0	12	early	brown	l rus	long	fair		++	+	-	++	fair	
VRF-rus	B8943- 4	150	16.8	238	73	63	-	25	54	9	0	12	e-med	tan	l rus	obl-l	poor		--	-	++	++	poor	
EM-rus	B8943- 4	239	26.8	246	67	97	-	3	53	35	8	0	v-e	brown	l rus	long	good		+	+	-	++	good	
SJ-rus	B8972- 1	172	19.3	209	-	82	-	0	61	21	0	18	early	brown	m rus	long	good		+	+	-	++	fair	
VRF-rus	B8972- 1	166	18.6	355	72	46	-	33	42	4	0	20	m-late	brown	m rus	obl-l	good		-	++	++	++	good	
JB-adv	B8972- 1	234	26.2	273	70	86	-	14	61	24	1	0	early	tan	net	obl-l	good		+	+	-	++	good	
EM-rus	B8972- 1	210	23.5	226	62	93	-	7	74	19	0	0	v-e	brown	h rus	long	good		+	+	-	++	good	
SJ-rus	B9333- 4	150	16.8	181	-	83	-	17	67	16	0	0	v-e	tan	l rus	obl	fair		+	++	++	++	good	
SJ-rus	B9333- 9	221	24.7	267	-	83	-	17	46	36	0	0	v-e	tan	net	rd-ob	good		++	+	++	++	fair	
SJ-rus	B9400- 2	192	21.5	235	-	81	-	19	69	12	0	0	early	buff	net	obl-l	good		+	++	++	++	exce	
VRF-rus	B9400- 2	133	14.9	280	69	47	-	40	47	0	0	12	early	buff	net	obl	fair		-	++	++	++	fair	
SJ-rus	B9400- 5	147	16.5	181	-	81	-	19	41	40	0	0	early	tan	l rus	obl	good		+	++	++	++	good	
VRF-rus	B9400- 5	147	16.5	275	65	54	-	42	47	7	0	5	e-med	brown	m rus	obl	good		+	++	++	++	good	
SJ-rus	B9434- 11	82	9.2	102	-	81	-	19	0	81	0	0	v-e	tan	l rus	long	good		++	++	++	++	poor	
VRF-rus	B9434- 11	276	30.9	375	72	74	-	11	54	12	7	15	early	brown	l rus	long	good		+	++	++	++	good	poor
SJ-rus	B9538- 9	95	10.6	141	-	67	-	33	40	27	0	0	e-med	brown	l rus	obl	fair		++	++	++	++	good	
SJ-rus	B9539- 6	119	13.3	163	-	73	-	27	65	8	0	0	v-e	tan	net	long	good		++	++	++	++	good	
SJ-rus	B9539- 14	165	18.4	192	-	86	-	14	28	58	0	0	e-med	brown	l rus	obl	good		+	-	++	-	fair	
SJ-rus	B9539- 18	225	25.2	258	-	87	-	13	61	26	0	0	early	brown	l rus	obl	fair		++	-	+	+	fair	
SJ-rus	B9539- 21	104	11.6	148	-	70	-	30	40	30	0	0	early	brown	l rus	obl	good		++	-	++	++	good	
SJ-rus	B9540- 14	160	17.9	198	-	80	-	20	56	24	0	0	early	tan	l rus	long	good		++	++	+	+	good	
SJ-rus	B9540- 24	165	18.4	197	-	84	-	16	50	34	0	0	v-e	brown	l rus	long	good		++	++	-	++	good	
SJ-rus	B9540- 29	150	16.8	174	-	86	-	14	47	39	0	0	early	tan	l rus	long	good		++	-	+	++	good	
SJ-rus	B9540- 33	206	23.1	228	-	90	-	10	42	49	0	0	early	brown	s net	long	poor		+	--	++	++	poor	
SJ-rus	B9540- 51	102	11.4	134	-	76	-	24	25	51	0	0	early	tan	l rus	obl-l	good		++	++	++	++	good	
SJ-rus	B9540- 55	186	20.8	220	-	85	-	15	42	42	0	0	med	tan	net	obl-l	good		++	++	++	+	fair	

New Jersey Table continued

Location	Variety	Market cwt	Market mt/h	Tot cwt	Sp Gr	Percent Tuber Sizes A	B	1	2	3	4	5	Vine Mat	T Color	U Text	B Shape	E	R Conf	Defects SG	GC	HH	ID	Overall	Chip Color
SJ-rus	B9545- 40	66	7.4	101	-	65	-	35	51	14	0	0	early	tan	l rus	rd-ob		good	++	-	++	++	fair	
SJ-rus	B9563- 2	224	25.1	265	-	84	-	16	53	31	0	0	v-e	buff	net	obl		good	++	++	--	++	fair	
SJ-rus	B9566- 1	221	24.7	261	-	84	-	16	62	22	0	0	med	brown	l rus	obl-l		fair	-	++	+	++	fair	
SJ-rus	B9566- 11	171	19.2	200	-	86	-	14	37	49	0	0	v-e	white	sm	round		good	++	++	+	++	fair	
SJ-rus	B9569- 2	160	17.9	198	-	80	-	20	64	16	0	0	v-e	tan	l rus	long		fair	++	++	-	+	good	
SJ-rus	B9585- 4	210	23.5	259	-	81	-	19	66	15	0	0	early	brown	l rus	long		excel	++	++	+	++	exce	
SJ-rus	B9604- 7	178	20.0	206	-	86	-	14	42	44	0	0	v-e	brown	net	long		good	++	+	-	+	good	
SJ-rus	B9635- 13	202	22.7	241	-	84	-	16	72	12	0	0	early	brown	l rus	long		good	++	++	++	++	good	
SJ-rus	B9648- 15	120	13.5	150	-	80	-	20	58	22	0	0	v-e	brown	l rus	obl-l		good	++	++	+	++	good	
SJ-rus	B9651- 1	169	19.0	229	-	74	-	26	70	4	0	0	early	tan	l rus	long		good	+	++	+	++	good	
SJ-rus	ALLAGASH	118	13.2	151	-	78	-	22	59	19	0	0	v-e	brown	l rus	obl-l		good	+	++	++	+	fair	
EM-rus	ALLAGASH	335	37.5	342	63	98	-	2	44	46	8	0	v-e	brown	l rus	obl		good	+	+	-	+	good	
SJ-rus	BELRUS	126	14.1	155	-	81	-	19	50	31	0	0	early	brown	m rus	long		fair	+	++	+	++	fair	
VRF-rus	BELRUS	233	26.1	374	73	62	-	17	55	7	0	21	med	brown	m rus	long		good	+	++	++	++	good	
JB-adv	BELRUS	254	28.4	283	71	90	-	10	53	30	6	0	e-med	brown	m rus	long		good	+	++	+	+	good	
EM-rus	BELRUS	171	19.1	175	68	97	-	3	58	36	4	0	v-e	brown	m rus	long		good	+	+	++	++	good	
SJ-rus	LEMHI	277	31.0	312	-	89	-	11	43	46	0	0	med	brown	l rus	long		fair	+	++	+	+	fair	
VRF-rus	LEMHI	250	28.0	339	72	74	-	23	64	10	0	3	late	brown	l rus	long		good	+	++	+	++	good	poor
EM-rus	LEMHI	267	30.0	273	77	98	-	2	48	45	5	0	e-med	brown	l rus	long		good	+	+	++	-	good	
SJ-rus	R BURBANK	229	25.7	261	-	88	-	12	23	65	0	0	e-med	tan	l rus	long		poor	--	+	+	++	poor	
VRF-rus	R BURBANK	137	15.4	325	69	42	-	23	42	0	0	35	late	brown	l rus	long		fair	--	++	++	++	fair	
EM-rus	R BURBANK	158	17.7	178	72	89	-	11	65	22	1	0	early	brown	net	long		poor	--	++	++	++	poor	
VRF-rus	RUSSETTE	183	20.5	333	70	54	-	36	50	4	0	9	late	brown	m rus	obl		fair	-	++	++	++	fair	
EM-rus	RUSSETTE	241	27.0	246	71	98	-	2	40	51	7	0	e-med	brown	l rus	obl		fair	++	+	++	++	fair	
SJ-rus	WF564-3	157	17.6	191	-	82	-	18	56	26	0	0	early	brown	m rus	long		good	++	++	+	++	good	
VRF-rus	WF564-3	139	15.6	405	57	35	-	34	31	4	0	32	m-late	brown	m rus	long		good	-	+	++	++	good	poor
EM-rus	WF564-3	385	43.1	391	70	98	-	2	48	38	12	0	early	tan	l rus	long		good	+	-	++	++	good	

Long Island, New York State

J.B. Sieczka and R.C. Neese

Results of Potato Variety Trials, 1981

Sixty-one clones were entered in four replicated variety trials conducted at the Long Island Horticultural Research Laboratory at Riverhead, New York. One hundred and forty-eight clones were entered in observational experiments. Soil at the Lab is classified as a Haven loam with approximately two percent organic matter. The early season was conducive to good potato growth. Natural precipitation was supplemented by irrigation through the growing season. However, August was an especially dry month with only 0.5 inches recorded and some moisture stress occurred. In addition, Colorado potato beetles were extremely difficult to control during the midseason. Both these factors affected the yield of entries in the variety trials. With this in mind data should be viewed in a relative sense. Yield potential and performance of a given clone should be made by comparing it to one of the standard varieties in the test. Appearance ratings and percent defects give a good estimate of these parameters.

In the Early Variety Trial (see Table 1) Superior produced the highest marketable yield. Entries that approached this level and had an acceptable appearance rating were Campbell 13, CC26-1A and CF7358-14A. In Main Season 1 (see Table 2) Belchip, Wauseon, AF186-5 and NY63 produced marketable yields equal to or better than Katahdin. Other lines which produced yields just below Katahdin were B7592-1, NY67 and S377-8. Internal necrosis appears to be a problem in B7592-1. Most of the entries from the USDA breeding program listed in Table 3 yielded at the same level or higher than Katahdin. However, tendency toward heat sprouts, other external defects or internal disorders eliminated most from future testing. In Main Season III, Michimac, AF92-3 and B9340-7 showed promise.

In the replicated russet trial (see Table 5) all USDA entries yielded more than BelRus and Russet Burbank. B8972-1 and B9395-25 show the most promise. None of the unnamed selections had high specific gravity.

Fertilizer trials were conducted on three recently named varieties, BelRus, Chipbelle and Rosa. BelRus yields, size and specific gravity were not affected by nitrogen rate. The lowest rate of nitrogen was 100 lb/A and the highest 270 lb/A. Chipbelle also was not affected by fertilizer rate. Yield and specific gravity of Rosa decreased as nitrogen rate increased.

Acknowledgments

Seed was provided by Robert Plaisted, Cornell University; Raymon Webb, USDA; and Hugh Murphy, University of Maine.

Long Island Table 1. Early Potato Variety Trial Results, Riverhead, New York 1981

Clone[1/]	Yield (cwt/A) Total	1-7/8-4	% of Sup 1-7/8-4	% of Total 1-7/8-4	Def[2/]	Spec[3/] Grav.	App[4/]	HH[5/]	Int[5/]	Vine[6/] Mat	Comments[7/]	Tuber Data[8/] Col.	Tex.	Shape	Depth
Campbell 13	270	230	91	85	2	76	7.8	0	0	6.8	Len	W	S	R	MT
Chippewa	223	176	70	79	7	65	7.3	0	4	6.8	Sl irr	BW	S	R-O	SF
Superior	282	253	100	90	0	73	7.0	0	0	8.0	Sl irr	Bu	SN	R-O	SF
B8751-6	220	174	69	79	1	73	8.0	0	0	8.3		Bu	SN	R-O	MT
CC26-1A	279	244	96	87	2	79	8.3	3	0	7.0	Att	Bu	SN	R-O	R
CF7358-14A	261	236	93	90	0	72	8.8	0	0	8.8	Att	Bu	N	O-R	R
CF7523-1	276	221	87	80	1	81	8.0	0	0	5.0		W	RS	R-O	MT
F69026	183	149	59	82	1	73	7.0	0	0	9.0		Pu	S	O-R	MT
NY68	209	176	70	84	2	69	7.5			9.0	Sk	W	RS	R	MT
Waller-Duncan (.05)	(68)	(67)				(2)									

1/ Planted April 16, 1981, vine killed August 4, 1981, harvested August 17, 1981, within row spacing 9.3". Fertilizer applied at a rate of 1000 lb/A of 10-20-10 -2 Mg in bands at time of planting, 60 lbs of N side dressed, 4 replications.

2/ Defects = Total of all defects. Letters in parenthesis are abbreviations for major defects. Abbreviations S = sunburn, Sc = scab, M = misshapen, G = growth cracks, L = prominent lenticels.

3/ Specific gravity determined by hydrometer. 1.0 omitted.

4/ Appearance rated on a scale of 1 to 9; 1 = extremely rough, unattractive, 9 = smooth, attractive.

5/ Number of tubers with hollow heart or internal necrosis of 40 tubers cut (10 per replication).

6/ Vine maturity rated on August 10, 1981 on a scale of 1 to 9, 1 = completely dead, 9 = green and vigorous.

7/ Comment abbreviations. Irr = irregular, Sl irr = slightly irregular, Sm = small, Sk = skinned, SE = shallow eyes, P = pink, HS = heat sprouts, CT = chain tubers, DAE = deep apical eyes, MDAE = moderately deep apical eyes, Att = attractive, Len = Prominent lenticels, St = stolons.

8/ Color - B=brown, BR=bright red, Bu=buff, BW=bright white, MR=medium red, P=pink, Pu=purple, W=white

Texture - HR=heavy russet, MR=medium russet, RS=relatively smooth, SN=slight net, S=smooth.

Shape - O=oblong, L=long, R=round.

Depth - F=flat, MT=medium thick, R=round, SF=slightly flattened.

Long Island Table 2. Main Season I, Riverhead, New York 1981

Clone[1]	Yield (cwt/A) Total	US No. 1 1-7/8-4	% Kat Yield 1-7/8-4	% of Total 1-7/8-4	Def[2]	Spec[3] Grav.	App[4]	HH[5]	Int[5]	Comments[6]	Tuber Data[7] Col.	Tex.	Shape	Depth
Katahdin	260	211	100	81	11 (Sc)	63	7.0	0	1	Sl irr	W	S	R	SF
Belchip	241	221	104	91	1	75	6.5	0	0	Irr	W	S	O-R	F
Campbell-11	209	156	73	75	17 (Sc)	82	7.3	0	0		Bu	N	R	SF
Chipbelle	243	189	89	78	5 (Sc)	82	6.8	1	0	Irr	Bu	SN	O	SF
Hudson	157	129	61	82	3	66	7.8	1	0	Sl irr	W	RS	R-O	SF
Rosa	222	139	65	62	13 (Sc)	68	6.8	0	1	Sm, Sk	W-P	S	R	SF
Wauseon	256	223	105	87	1	72	6.8	0	1	Sl irr	Bu	SN	R	MT
AF186-5	261	214	100	82	4, (Sc)	77	6.5	0	0	Sm, Irr	Bu	N	O-R	MT
AF205-9	213	122	57	57	17 (Sc)	76	7.3	1	0	SE	Bu	SN	O	MT
B7592-1	231	194	91	84	2 (Sc)	68	7.8	0	8		W	S	O	R
B7200-33	216	132	62	61	3 (Sc)	70	7.8	0	0	Sm	W	S	R	R
NY-63	287	226	106	79	14 (Sc)	64	7.0	1	1	Sl irr	W	S	R	R
NY67	230	203	95	88	2 (Sc)	63	7.0	0	4	Sl irr	W	S	R	MT
S376-2	224	168	79	75	4 (Sc)	64	7.5	0	0	P buds	Bu	SN	R	R
S377-8	273	195	91	71	7 (Sc)	62	8.0	0	1	P buds	Bu	SN	R	R
S377-41	181	128	60	70	4 (Sc)	69	8.5	1	0	Sm, HS	Bu	SN	R	R
Waller-Duncan (.05)	(64)	(76)				(5)								

1/ Planted April 10, 1981, vine killed September 4, 1981, harvested Oct. 7, 1981. See footnote Table 1.

2/-7/ - See appropriate footnotes in Table 1.

Long Island Table 3. Main Season II, Riverhead, New York 1981

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US No. 1 1-7/8-4	% Kat Yield 1-7/8-4	% of Total 1-7/8-4	% of Total Def[2]	Spec[3] Grav.	App[4]	HH[5]	Int[5]	Comments[6]	Tuber Data[7] Col.	Tex.	Shape	Depth
Katahdin	202	180	100	89	2	63	7.3	0	0	Sl irr	W	RS	R	SF
Hudson	164	141	78	86	2	64	7.3	1	0	Sl irr	W	RS	R	MT
B8710-16	233	191	106	82	2	72	7.5	1	4	Sl irr	W	RS	O-R	MT
B8771-6	235	209	116	89	1	81	7.3	0	7	Len	W	RS	O-R	MT
B8798-20	253	233	129	92	0	79	6.3	0	0	HS, Irr	Bu	SN	R	MT
B8799-13	250	211	117	84	4	81	6.5	3	1	Irr, Sm	Bu	SN	R-O	MT
B8907-4	231	213	118	92	4	70	6.5	10	0	DAE	Bu	SN	R-O	MT
B9018-12	257	225	125	88	2	72	6.0	0	0	HS, CT, Irr	Bu	SN	R	MT
B9140-32	231	211	117	91	0	79	7.0	1	3	Irr	Bu	N	R	MT
B9142-4	215	171	95	80	0	69	7.5	0	3	SE	T	SN	O-R	MT
B9224-6	259	226	126	87	1	74	6.8	0	0	HS	Bu	RS	R-O	MT
B9279-9	221	172	96	78	3	75	7.3	0	4	Sm	Bu	SN	R	R
B9285-3	230	202	112	88	1	74	7.3	0	13	HS	Bu	SN	R	MT
B9286-1	196	156	87	80	2	61	6.8	0	0	HS	W	S	R-O	R
B9332-1	224	188	104	84	0	79	7.3	0	0	Sm	W	SN	R-O	R
B9335-60	216	165	92	76	3	77	7.0	0	0	Sm	Bu	SN	O	MT
Waller-Duncan (.05)	(52)	(52)				(2)								

1/ Planted April 10, 1981, vine killed September 4, 1981, harvested Oct. 7, 1981. See footnote Table 1.

2/-7/ - See appropriate footnotes in Table 1.

Long Island Table 4. Main Season III, Riverhead, New York, 1981

Clone[1]	Yield (cwt/A) Total	US No. 1 1-7/8-4	% Kat Yield 1-7/8-4	% of Total 1-7/8-4	Def[2]	Spec[3] Grav.	App[4]	HH[5]	Int[5]	Comments[6]	Tuber Data[7] Col.	Tex.	Shape	Depth
Katahdin	301	264	100	88	1	61	7.3	0	0	St, Sl irr	W	S	R-O	MT
Michibonne	314	287	109	92	0	69	7.3	0	0	HS, MDAE	W	SN	R-O	MT
Michimac	281	244	92	87	1	64	8.0	0	0	SE	W	S	R	SF
Rosa	262	187	71	71	1 (Sc)	63	7.0	0	0	Sm, St, Sk	W-P	S	R	SF
Shepody	221	165	63	75	14 (M)	68	4.5	0	1	HS, Irr	W	SN	O-L	SF
AF92-3	362	318	121	88	1	66	7.0	0	1	Irr	W	SN	O-R	MT
AF238-66	298	253	96	85	1	70	7.0	0	0	HS! Irr	W	RS	O-R	MT
B6043-WV6	193	137	52	71	1	66	6.8	0	1	CT, Irr	W	SN	R	MT
B8086-3	292	264	100	90	1	66	7.0	0	0	Irr, Off wh	Bu	SN	R	MT
B9336-27	311	280	106	90	1	78	6.3	2	8	HS! Irr	W	RS	O	SF
B9340-3	295	269	102	91	1	72	6.8	0	0	HS! Irr	W	RS	R-O	MT
B9340-7	261	241	91	92	0	78	8.0	1	0	SE, Sl irr	Bu	SN	R	R
B9340-13	258	211	80	82	1	72	6.5	2	0	HS! Irr	Bu	SN	O-R	MT
B9384-6	319	262	99	82	9 (G,L)	68	6.3	0	0	Sl irr, Len	Bu	SN	R	MT
BR5991-WV16	379	338	128	89	1 (M)	75	6.3	9	20	St, HS, CT, Irr	Bu	SN	R	R
CF7353-1	322	288	109	89	2	73	6.5	1	13	SE	Pu-Bu	SN	R	MT
Waller-Duncan (.05)	(33)	(31)				(3)								

1/ Planted April 10, 1981, vine killed September 4, 1981, harvested Oct. 7, 1981. See footnote Table 1.

2/-7/- See appropriate footnotes in Table 1.

Long Island Table 5. Russet Variety Trial Results, Riverhead, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US No. 1 4-16 oz	% BelRus Yield 4-16 oz	% of Total <4	% of Total 4-10	% of Total 10-16	% of Total Def[2]	Spec. Grav.[3]	App.[4]	HH[5]	Int.[5]	Comments	Tuber Data[7] Col.	Tuber Data[7] Tex.	Tuber Data[7] Shape	Tuber Data[7] Depth
BelRus	130	68	100	48	51	1	0	69	8.0	0	0		B	HR	L	SF
R. Burbank	116	34	50	50	30	0	20(M)	75	4.8	0	8	Irr	B	MR	L	MT
B8972-1	253	160	235	37	62	1	1	69	7.8	3	0		B	MR	L-O	MT
B9020-18	220	143	210	35	63	2	1	68	7.3	2	13	Sl irr	B	MR	O-R	SF
B9395-3	151	64	94	57	41	1	2	66	7.0	0	0	Sm, Sl irr	B	MR	L-O	MT
B9395-7	213	160	235	24	72	3	1	70	6.8	0	2	HS, Sl irr	B	MR	O-L	MT
B9395-25	196	133	196	32	66	1	1	69	7.3	0	4	Sl irr	B	MR	O-L	MT
B9399-1	166	88	129	46	52	1	1	62	7.5	0	0		B	MR	L-O	MT
Waller-Duncan (.05)	(15)	(16)						(4)								

Long Island Table 6. Russet Observational Trial Results, Riverhead, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US No. 1 4-16 oz	% BelRus Yield 4-16 oz	% of Total <4	% of Total 4-10	% of Total 10-16	% of Total Def[2]	Spec. Grav.[3]	App.[4]	Comments[5]	Tuber Data[6] Col.	Tuber Data[6] Tex.	Tuber Data[6] Shape	Tuber Data[6] Depth
BelRus	221	139	100	37	63	--	--	69	8	SE	B	HR-PR	L	SF
R. Burbank	180	87	63	34	43	6	17(M)	67	5	Irr	B	MR	L	MT
B9333-4	164	123	88	22	75	--	3	60	8		T	MR	L	SF
B9333-6	159	72	52	55	45	--	--	70	8	SE	B	MR	L	MT
B9333-9	272	190	137	28	66	4	2	62	7	Sl irr	B	MR	O-L	MT
B9347-5	205	154	111	20	75	--	5	65	7		B	MR	O	SF
B9391-2	221	118	85	44	54	--	2	64	7		B-W	PR	L	MT
B9395-8	216	108	78	50	50	--	--	59	7		B	HR	O	R
B9397-7	87	51	37	35	59	--	6	62	9	SE	T	MR	L	R
B9398-2	133	103	74	19	65	12	4	65	7	Irr	B	HR	O	SF
B9400-2	103	36	26	60	35	--	5	67	8		B	MR	O-L	R
B9419-1	139	82	59	37	52	7	4	67	7	Sl irr	B	MR	L	SF
B9434-11	87	31	22	59	29	6	6	--	7		B	MR	L	SF
B9434-13	133	67	48	50	50	--	--	--	7	Sc	B	MR	O	SF

1/ Planted April 14, 1981, vine-killed September 4, 1981, harvested October 13, 1981, see footnote 1, Table 1.

2/ - 7/ See appropriate footnotes in Table 1.

Table 7. BelRus Fertilizer Rate and Timing

lb N/A at			Yield (cwt/A)		% of Total Yield			Specific
Planting	4-6"	10-12"	Total	4-16 oz	<4	4-10	10-16	Gravity
100	0	0	186	127	31	65	3	1.073
100	60	0	183	133	27	68	4	1.071
100	120	0	195	143	26	68	4	1.073
100	60	60	163	112	31	65	3	1.072
150	0	0	180	128	28	66	4	1.072
150	60	0	167	117	29	66	3	1.073
150	120	0	175	130	25	66	7	1.071
150	60	60	174	126	27	67	4	1.072
			(ns)	(ns)				(ns)
Main Effects								
100			182	129				1.072
150			178	125				1.072
Sidedress								
	0	0	183	128				1.072
	60	0	175	125				1.072
	120	0	185	137				1.072
	60	60	169	119				1.072

Planted 5/4/81, all plots received 0-200-100-50 MgO/A at planting, harvested 9/8/81.

Table 8. Rosa Nitrogen Rate Experiment[1/]

N Rate	Yield (cwt/A)		% of Total	Spec.		
	Total	1 7/8-4	1 7/8-4	Grav.	Int.	H. H.
50	276	244	88	1.067	7/40	4/40
100	255	223	87	1.063	7/40	0/40
150	258	213	82	1.062	8/40	1/40
200	242	208	85	1.061	2/40	1/40
Sig Level	(ns)	(.05)		(.05)		

Table 9. Chipbelle Nitrogen Rate Experiment[1/]

N Rate	Yield (cwt/A)		% of Total	Spec.		
	Total	1 7/8-4	1 7/8-4	Grav.	Int.	H. H.
50	218	189	86	1.084	0/40	5/40
100	217	195	90	1.087	0/40	9/40
150	200	178	89	1.082	0/40	1/40
200	215	188	87	1.085	0/40	2/40
Sig Level	(ns)	(ns)		(ns)		

1/ Planted 4/22/81, all plots received 0-300-150-50 MgO/A at planting, vine killed 9/12/81, harvested 10/15/81.

NEW YORK (LONG ISLAND)

R. Loria and B. A. Taborsky

Evaluation of Potato Varieties and Breeding Lines for Resistance to Common Scab at Riverhead, New York: 1981

Procedure. Seedpieces of 70 breeding lines and varieties were planted on April 27 in a Haven-loam soil which was naturally infested with S. scabies. Seedpieces were placed 12 in apart with 34 in between rows, and plots were fertilized (10-20-10, 1000 lb/A) at planting. 'Chippewa' plots were planted adjacent to test plots and scab infection data from these plots were used as a standard against which to compare infection.

Weeds were controlled with normal cultivation and applications of Lasso at 2 qt/A and Lorox at 2 lb/A on May 8, and Eptam at 50 lb/A on June 10. Foliar sprays were applied when necessary for insect and disease control. Plots were not irrigated in order to increase disease pressure. However, rainfall during the months of May and June totalled 7.5 inches. Plots were harvested on October 20.

Tubers, usually 40, from each 10-hill plot were washed and examined for scab lesions. Each tuber was scored 0 (no lesions) to 4 (deep pits) for type of scab present and 0 (no scab) to 5 (61 percent or more) for surface area covered by scab lesions. These values were converted to individual tuber indices that ranged from 0 (no scab) to 140 (61 percent or more of surface area covered by deep pitted scab). The scab index for each plot was calculated by dividing the sum of the individual tuber indices by the number of tubers examined. The index for each variety and breeding line in the replicated trial was determined by calculating the average of the scab indices from the two plots. A scab index ratio was calculated for each variety and breeding line by dividing the index of the variety or breeding line by the index of the paired Chippewa plot and multiplying the quotient by 100. Similar ratios were calculated for percent tubers with scab and average lesion type. These ratios allow comparison of scab resistance of the varieties or breeding lines to a scab-susceptible standard, Chippewa, and to each other. This is important since disease pressure is not equal throughout the field.

Results. Lines which appeared to be most resistant (scab index ratios of less than 10) were: B113-6, CS7622-8, CS7684-9, U715-76, U756-7 and U756-31. Other test lines were moderately resistant (scab index ratios of 11-30): B111-3, CS7198-1, CS7619-9, CS7638-22, CS73107-10, T30-47, U681-3, U699-5, U715-12, U715-94A, U720-3, U723-8, U723-29, U727-5, U729-15, U731-5, U741-49, U756-9, U756-45, U757-84, U757-93.

Table 1. Susceptibility of potato breeding lines and varieties to Streptomyces scabies, as compared to the 'Chippewa' variety at Riverhead, New York: 1981.

Cultivar or breeding line	Scab index			Average lesion type			% Tubers with scab		
	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio
10-hill, non-replicated, 40 tubers:									
B111-3	1.8	6.7	26.9	2.2	2.3	95.6	47.5	77.5	61.3
B113-6	0.4	6.9	5.8	2.0	2.4	83.3	17.5	70.0	25.0
CS7591-6R	4.2	5.4	77.8	2.1	2.1	100.0	77.5	75.0	103.3
CS7598-1R	2.3	5.4	42.6	2.3	2.4	95.8	60.0	67.5	88.9
CS7619-9	1.7	7.8	21.8	2.0	2.5	80.0	57.5	60.0	95.8
CS7622-8	0.3	4.4	6.8	1.8	2.2	81.8	15.0	55.0	27.3
CS7638-22	1.9	7.8	24.4	2.2	2.4	91.7	47.5	62.5	76.0
CS7639-1	1.6	4.0	40.0	2.1	2.4	87.5	42.5	58.0	73.3
CS7684-9	0.4	7.4	5.4	1.8	2.6	69.2	22.5	80.0	28.1
CS7685-6	2.0	4.0	50.0	2.1	2.3	91.3	55.0	70.0	78.6
CS73107-8	2.0	5.8	34.5	2.0	2.2	90.9	57.5	70.0	82.1
CS73107-10	0.6	4.4	13.6	2.0	2.6	76.9	27.5	47.5	57.9
U681-3	0.2	1.5	13.3	2.0	2.2	90.9	12.5	47.5	26.3
U683-13	3.4	2.4	141.7	2.5	2.3	108.7	42.5	50.0	85.0
U685-5	1.8	2.4	75.0	2.4	2.3	104.3	38.5	47.5	81.0
U688-1	1.6	2.9	55.2	2.0	2.0	100.0	42.5	60.0	70.8
U694-10	1.4	2.4	58.3	2.0	2.0	100.0	55.0	57.5	95.6
U697-1	2.2	1.8	122.2	2.0	1.9	105.3	47.5	47.5	100.0
U699-5	0.8	4.4	18.2	2.0	2.2	90.9	30.0	75.0	40.0
U699-23	2.4	2.3	104.3	2.1	2.3	91.3	52.5	45.0	116.7
U709-3	1.8	4.8	37.5	2.0	2.2	90.9	47.5	57.5	82.6
U711-24	2.7	3.2	84.4	2.0	2.5	80.0	65.0	37.5	173.3
U713-6	3.0	8.4	35.7	2.2	2.6	84.6	62.5	61.5	101.6
U713-23	3.4	1.9	178.9	2.0	2.5	80.0	62.5	43.2	144.7
U715-12	1.8	7.2	25.0	2.0	2.2	90.9	45.0	75.0	60.0

(Table 1 continued next page)

Table 1. (continued)

Cultivar or breeding line	Scab index			Average lesion type			% Tubers with scab		
	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio
(10-hill, non-replicated, 40 tubers:)									
U715-13	1.2	2.5	48.0	2.0	2.4	83.3	45.0	40.0	112.5
U715-34	2.6	5.6	46.4	2.0	2.1	95.2	57.5	65.0	88.5
U715-52	1.8	1.5	120.0	2.0	2.3	87.0	50.0	37.5	133.3
U715-64	2.3	5.2	44.2	2.0	2.2	90.9	45.0	65.0	69.2
U715-76	0.2	4.0	5.0	2.0	2.3	87.0	10.0	66.7	15.0
U715-94A	1.7	8.4	20.2	2.0	2.4	83.3	47.5	80.0	59.4
U720-3	4.8	17.5	27.4	2.1	2.6	80.8	67.5	90.0	75.0
U720-8	4.6	2.4	191.7	2.1	2.2	95.4	85.0	40.0	212.5
U723-8	1.7	7.0	24.3	2.0	2.3	87.0	60.0	72.5	82.8
U723-29	1.3	8.0	16.2	2.1	2.3	91.3	42.5	75.0	56.7
U725-3	2.8	5.1	54.9	2.1	2.3	91.3	67.5	77.5	87.1
U727-5	0.8	3.8	21.0	2.0	2.4	83.3	27.5	57.5	47.8
U727-22	2.4	4.8	50.0	2.1	2.2	95.4	75.0	67.5	111.1
U728-3	2.8	5.4	51.8	2.0	2.4	83.3	62.5	67.5	92.6
U729-15	1.4	5.2	26.9	2.0	2.3	87.0	55.0	75.0	73.3
U729-21	1.4	4.4	31.8	2.0	2.2	90.9	50.0	55.0	90.9
U731-5	1.2	4.1	29.3	2.0	2.3	87.0	42.5	67.5	63.0
U736-3	1.8	4.0	45.0	2.0	2.4	83.3	55.0	58.0	94.8
U740-27	0.8	2.2	36.4	2.0	2.2	90.9	30.0	60.0	50.0
U741-20	3.4	9.2	37.0	2.0	2.4	83.3	80.0	70.0	114.3
U741-27	4.4	3.2	137.5	2.0	2.2	90.9	85.0	57.5	147.8
U741-36	2.1	4.4	47.7	2.0	2.6	76.9	62.5	47.5	131.6
U741-49	1.3	5.8	22.4	2.0	2.7	74.1	40.0	52.5	76.2
U747-8	2.9	3.4	85.3	2.2	2.3	95.6	65.0	55.0	118.2
U756-3	2.4	4.3	55.8	2.1	2.3	91.3	62.5	57.5	108.7

(Table 1 continued next page)

Table 1. (continued)

Cultivar or breeding line	Scab index			Average lesion type			% Tubers with scab		
	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio	Test Line	Chipp-ewa	Ratio
U756-7	0.2	3.9	5.1	1.8	2.3	78.3	12.5	57.5	21.7
U756-9	0.3	2.0	15.0	1.7	1.8	94.4	15.0	62.5	24.0
U756-31	0.2	4.4	4.5	1.2	2.2	54.5	15.0	72.5	20.6
U756-38	2.4	4.6	52.2	2.0	2.0	100.0	60.0	72.5	82.8
U756-45	0.8	3.6	22.2	1.3	1.9	68.4	45.0	85.0	52.9
U757-70	0.8	2.4	33.3	2.2	2.1	104.8	20.0	57.5	34.8
U757-74	1.0	2.0	50.0	1.4	1.8	77.8	42.5	55.0	77.3
U757-84	0.4	1.5	26.7	1.8	1.9	94.7	15.0	42.5	35.3
U757-93	0.6	3.7	16.2	1.5	2.3	65.2	32.5	52.5	61.9
10-hill, 2 replications, 80 tubers:									
CS7198-1	1.0	5.1	19.6	2.1	2.2	95.4	31.2	66.3	47.0
CS7827-10	3.4	3.4	100.0	2.1	2.3	91.3	67.5	57.6	117.2
CS77118-19RdR	1.5	2.6	57.7	2.2	2.1	104.8	37.5	55.0	68.2
CS78155-1	1.7	2.8	60.7	2.2	2.0	110.0	46.2	62.5	73.9
NY59	0.7	1.8	38.9	2.2	2.3	95.6	23.8	45.4	52.4
S376-2	0.8	2.3	34.8	1.8	1.9	94.7	27.5	43.8	62.8
Superior	0.3	3.4	8.8	2.1	2.2	95.4	8.8	58.8	15.0
T4-20	1.8	2.8	64.3	2.1	2.4	87.5	31.6	38.8	81.4
T11-29	1.1	1.5	73.3	2.0	2.1	95.2	42.5	41.2	103.2
T30-47	1.2	6.2	19.4	1.7	2.2	77.3	38.8	73.8	52.6
T37-29	1.5	2.1	71.4	2.2	2.0	110.0	48.8	59.1	82.6

NEW YORK STATE

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Results of Potato Variety Trials in Upstate New York 1980-1981

The Vegetable Crops Department conducted nine replicated variety trials in upstate New York in 1981 in which a total of one hundred and twenty clones were entered. Six trials were conducted at the Thompson Vegetable Research Farm at Freeville on a Howard gravelly loam, two in Wayne County on muck soil near Savannah and one on mineral upland soil in Steuben County near Avoca. Two hundred and sixty observational clones were evaluated in an unreplicated trial and three fertilizer experiments were conducted at the Thompson Vegetable Research Farm.

Field data for 1981 are listed in Tables 1-13. Emphasis on golden nematode resistant varieties and clones was top priority. Promising resistant clones are AF186-5, NY68, NY63, NY59, T37-29, T20-5. Resistant varieties that continue to yield competitively are Atlantic, Belchip, Chipbelle, Peconic, Rosa, and Wauseon. Noteworthy entries without golden nematode resistance are the early maturing clones: CF7523-1, C7358-14A and B7805-1 and the main season clones: Denali, Michibonne, Michimac, B6043-WV6, B8086-3, B8798-20 and F69026. Promising russets include BelRus, B9391-2, B9395-25 and B9400-5.

Hollow heart was a major problem in 1981, especially in the Steuben County trial. Entries with greater than 12% hollow heart include Atlantic, Belchip, Chipbelle, Denali, Jemseg, Lemhi Russet, Monona, Norchip, Rosa, Russet Burbank, Shepody, Trent, AF186-5, B7151-4, BR7093-23 and T5-10.

In the replicated fertilizer trial with Rosa (Table 11), total yield was significantly higher at 200 lbs/A N than with 50, 100 or 150 lbs/A N, but no significant difference in US #1 yield was found between 150 and 200 lb/A N. The replicated fertilizer experiment (Table 12) comparing Chipbelle and AF186-5, displayed no significant difference in yield, tuber number or mean tuber weight between varieties. Specific gravity was significantly higher in Chipbelle and hollow heart was a major problem for both. Yields were significantly higher in response to nitrogen fertilization up to 150 lbs/A and then leveled off. An experiment with BelRus (Table 13) with between and within row spacing and two nitrogen rate treatments showed that yield of US #1's is significantly greater in a two row arrangement with 36" between rows than a three row arrangement with 18" between rows. No significant difference in yield due to spacing within the row of 9" versus 12" or nitrogen rate of 150 lbs/A versus 200 lbs/A was found.

Storage results for 1980 (Tables 14-15) indicate that clones with the best potato chip potential are Atlantic, Monona, Rosa, Chipbelle, B7151-4, B8771-6, B8783-6, B8798-20, B8799-8, B8887-1, B9097-5, C7232-4, ND9403-16R, Q155-3 and S376-2. After-cooking darkening of an objectionable level was found in Norland, B7583-6 (Russette), B8934-4, B9020-18 and ND146-4R. Clones that lost more than 12% of total weight due to the combination of sprout weight and general shrinkage are Belchip, BelRus, Dakchip, Norchip, Norland, Rideau, Rosa, AF186-5, B8922-10, B9016-20, B9019-14, B9020-18 and ND146-4R.

Acknowledgements

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Upstate New York Table 1. Tuber characteristics of clones in replicated trials, 1981.

Clone	Color	Texture	Shape	Depth	Clone	Color	Texture	Shape	Depth
Atlantic	Bu	SN	R	SF	B9335-7	Bu	SN	R	MT
Belchip	W-Bu	SN	R	SF-F	B9335-17	W	S	R-O	MT
BelRus	DB	HR	O	SF	B9335-34	W	SN	O-R	MT
Chipbelle	Bu	SN	O	F	B9335-35	Bu	SN	R	SF
Denali	W	SN	R	SF	B9335-60	W-Bu	RS	O-R	SF
Highlat Rus.	B	LR	O	SF	B9336-27	W-Bu	SN	L-O	F-SF
Jemseg	Bu	SN	R-O	MT	B9340-3	W	SN	R	MT
Hudson	W	SN	R-O	SF	B9340-7	Bu	SN	R	MT
Katahdin	W	SN	R-O	SF	B9340-13	W-Bu	RS	O-R	SF
Kennebec	W	S	O	F-SF	B9384-4	Bu	SN	R-O	MT
Lemhi	B	MR	O	SF	B9384-6	Bu	SN	R	MT
Michibonne	W	SN	R	SF	B9391-2	B	M-HR	O	SF
Michimac	W	SN	R	F-SF	B9395-3	B	MR	O	SF
Monona	W	SN	R	SF	B9395-7	B	MR	O	F
Norchip	W	S-SN	R	SF	B9399-23	Bu	LR	O	F
Peconic	W	SN	R	F	B9400-5	B	M-HR	O	SF
Rosa	W-PK	S	R	SF	B9473-2	W-Bu	RS	R	SF
Rus.Burbank	B	MR	O	F	BR5991-WV16	W	SN	R	SF
Shepody	W	SN	L	F	BR7093-23	W	S	R-O	SF
Simcoe	W	SN	R	SF	C7232-4	W-Bu	S	O-R	MT
Superior	Bu	SN	R-O	MT	C7348-14A	Bu	SN	O	MT
Trent	B	SN	R-O	SF	CC26-1A	Bu	SN	O	MT
Wauseon	W	SN	R	SF	CF7523-1	W	S	R	MT
AF92-3	W	SN	O	SF	F69026	P	S	O	SF
AF186-5	Bu	SN	R-O	SF	NY59	W-Bu	SN	R	MT
AF238-66	W	S	O-L	SF	NY63	W-Bu	SN	R	MT
B6043-WV6	Bu	SN	O	SF	NY67	W	S	R	SF
B7151-4	Bu	SN	R	F-SF	NY68	W	S	R-O	MT
B7592-1	W	S	O-L	SF	S376-2	Bu	SN	R	SF
B7805-1	W	RS	R-O	MT	S377-8	Bu	SN	R	MT
B8086-3	W	SN	R	T	S377-41	Bu	SN	O	MT
B8491-1	Bu	SN	O	SF	T4-20	Bu	SN	R	SF
B8514-8	W	SN	O-R	SF	T5-10	Bu	RS	R	MT
B8710-1	W	RS	O-L	SF	T5-24	Bu	SN	R	MT
B8771-6	W	SN	R	F-SF	T11-29	W	RS	R	MT
B8798-20	W	SN	R	MT	T20-5	Bu	SN	R	MT
B8799-8	BW	S	R	MT	T30-36	Bu	SN	R	SF
B8799-13	W-Bu	SN	O-R	SF	T30-47	Bu	SN	R-O	MT
B8887-1	Bu	SN	R	MT	T30-71	W	S	R	MT
B9020-18	B	HR	O	F	T37-29	W	S	R	MT
B9062-5	W	S	R-O	MT	T53-26	Bu	SN	R	MT
B9097-5	B	SN	R-O	MT	T88-6	W-Bu	RS	R	MT
B9285-3	Bu	SN	R	SF	T272-32	W	S	R-O	SF
B9286-1	W	S	O-R	F	T275-100	W	S	R	MT
B9332-1	Bu	SN	R	SF					

Abbreviations: Color - B = brown, Bu = buff, BW = bright white, DB = dark brown, P = purple, PK = pink, W = white
Texture - H = heavy russet, MR = medium russet, LR = light russet, RS = relatively smooth, SN = slight net, S = smooth
Shape - O = oblong, L = long, R = round
Depth - F = flat, MT = medium thick, R = round, SF = slightly flattened

Upstate New York Table 2. Variety Trial 1. Early White, Freeville, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US #1 1⅞-4	% Sup Yield 1⅞-4	% of Total Yield US No. 1 1⅞-2½	% of Total Yield US No. 1 2½-3¼	% of Total Yield US No. 1 3¼-4	% of Total Yield US No. 1 >4	Defects[2]	MTW[3] (oz)	Spec Grav[4]	HH[5]	App[6]	Vine Mat[7]
CF7523-1	485	459	145	15	52	28	0	3	6.2	79	0	7.8	6.3
NY68	453	415	131	17	63	12	0	6	5.7	77	1	7.0	4.5
CC26-1A	407	372	118	15	57	20	2	5	7.6	86	3	6.8	3.8
C7358-14A	371	330	104	14	54	21	2	6	5.9	76	0	7.0	1.5
B7805-1	361	319	101	9	41	38	1	7	7.6	75	3	7.5	4.3
Superior	333	318	100	17	66	12	0	2	5.1	77	0	7.0	2.3
B8887-1	366	317	100	20	49	18	1	8	4.8	85	1	6.8	3.3
Jemseg	372	309	98	6	42	35	3	13(GC)	7.9	73	7	7.0	1.3
B9097-5	341	307	97	12	59	19	0	8	5.7	77	1	6.8	1.5
C7232-4	321	303	95	13	58	24	0	3	5.9	78	1	6.8	2.5
Trent	275	259	82	18	65	12	0	3	5.6	93	13	6.8	6.8
Waller-Duncan (.05)	(59)	(63)							(0.7)	(3)			
Other[8]													
B9062-5	328	283	89	10	51	24	0	12(GC)	6.5	78	0	6.7	3.0

1/ Planted May 7, vines mowed August 19, harvested August 26, between row spacing 34", within row spacing 9.9", 1000 lbs/A of 15-15-15 applied in bands at time of planting.
2/ Defects = Total of all defects. Defects >7% in parenthesis with the major defects listed first. Abbreviations: S = sunburn, M = misshapen, GC = growth cracks.
3/ MTW = Mean tuber weight in ounces.
4/ Spec Grav = Specific gravity determined by hydrometer with 1.0 omitted.
5/ HH = Number of tubers with hollow heart and/or brown center of 40 tubers cut (10 per replication).
6/ App = Appearance rating based on a scale of 1 to 9; 1 = extremely rough unattractive, 9 = smooth attractive.
7/ Vine maturity rated on a scale of 1 to 9, 1 = completely dead, 9 = green and vigorous. Rated September 19.
8/ Not included in analysis of variance. Thirty tubers examined for hollow heart and/or brown center.

Upstate New York Table 3. Variety Trial 2. Cornell Golden Nematode Resistant Clones, Freeville, New York, 1981.

Clone[1]	Yield (cwt/A)		% Kat Yield	% of Total Yield					MTW[3]	Spec[4]			Vine[7]
		US #1		US No. 1									
	Total	1⅞-4	1⅞-4	1⅞-2½	2¼-3¼	3¼-4	>4	Defects[2]	(oz)	Grav	HH[5]	App[6]	Mat
T37-29	553	481	109	12	42	33	3	7	6.6	76	1	8.0	4.5
T20-5	550	472	107	9	38	39	3	9	7.7	73	0	6.5	4.8
Katahdin	506	440	100	11	48	29	2	8	6.4	85	3	7.0	7.0
Rosa	477	422	96	20	50	18	1	5	5.5	84	0	7.0	6.5
T30-47	476	407	93	11	51	23	2	9	7.4	77	0	6.8	3.8
T88-6	457	403	92	19	51	19	1	6	5.4	75	0	7.8	2.0
T11-29	449	395	90	18	46	24	1	6	5.9	82	0	7.5	4.3
T30-71	461	386	88	16	42	26	3	10(GC)	5.9	73	0	7.5	5.3
T272-32	420	383	87	21	47	23	1	3	5.6	77	1	7.5	5.0
T30-36	431	382	87	17	47	25	1	7	6.2	74	0	7.3	3.8
T275-100	425	364	83	21	52	12	1	10	5.5	83	0	6.5	5.3
T5-24	411	364	83	11	44	34	2	6	6.3	68	0	7.3	2.5
T5-10	387	320	73	7	20	45	17	10(S)	5.1	79	6	7.3	5.8
T53-26	372	304	69	19	38	25	2	8	5.6	86	0	7.0	5.5
Waller-Duncan(.05)	(59)	(58)							(1.0)				
Other[8]													
T4-20	383	334	76	14	34	39	7	4	6.4	80	0	7.8	4.7

[1] Planted May 8, vines sprayed with 1.6 lbs/A ametryn September 1 and 2.5 lbs/A dinoseb September 10, harvested September 14, within row spacing 9.8". See footnote 1, Table 2.

[2]-[6] See appropriate footnotes, Table 2.

[7] Vines rated August 27. See footnote 7, Table 2.

[8] See footnote 8, Table 2.

Upstate New York Table 4. Variety Trial 3. Freeville, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US #1 1⅞-4	% Kat Yield 1⅞-4	% of Total Yield US No. 1 1⅞-2½	% of Total Yield US No. 1 2½-3¼	% of Total Yield US No. 1 3¼-4	% of Total Yield US No. 1 >4	% of Total Yield Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	App[6]	Vine Mat[7]
NY63	500	457	113	12	57	22	0	7	6.2	82	0	7.3	5.5
BR7093-23	498	453	112	10	49	32	2	6	7.3	83	3	7.5	6.0
Rosa	471	426	107	19	56	15	2	6	5.5	83	3	7.3	6.3
Atlantic	467	419	104	17	50	22	0	8	6.9	87	5	7.0	5.8
Katahdin	451	410	100	14	50	27	1	6	6.5	82	2	6.5	5.3
NY59	457	408	100	10	46	33	5	4	6.8	83	0	7.0	8.0
AF186-5	432	405	99	16	59	19	0	5	6.0	81	9	7.3	5.8
Belchip	437	400	98	12	54	26	1	6	6.7	84	3	6.3	5.5
NY67	442	399	98	14	48	29	1	6	6.2	80	1	7.5	5.8
S377-8	434	397	97	13	54	23	1	7	5.8	71	0	7.8	5.0
S376-2	437	380	94	17	48	22	4	7	5.9	71	3	7.0	5.0
Peconic	411	369	91	18	51	20	1	7	5.7	82	4	6.8	5.3
AF238-66	411	364	91	28	51	9	0	6	5.8	75	3	7.0	3.8
S377-41	429	358	89	14	53	17	1	13	6.0	76	3	8.0	5.3
Norchip	403	351	88	19	53	16	1	9	5.8	85	1	7.3	5.0
Chipbelle	370	342	85	23	58	11	0	6	5.4	100	3	6.5	5.8
B7592-1	363	336	83	23	57	13	0	4	5.7	82	1	7.0	5.0
B8491-1	322	300	74	14	53	26	2	3	7.1	78	0	6.3	4.5
Waller-Duncan (.05)	(67)	(71)							(1.5)	(7)			

[1] Planted May 8, vines sprayed with 1.6 lbs/A ametryn September 1 and 2.5 lbs/A dinoseb September 10, harvested September 16, within row spacing 9.6". See footnote 1, Table 2.

[2]-[6] See appropriate footnotes, Table 2.

[7] Vines rated August 27. See footnote 7, Table 2.

Upstate New York Table 5. Variety Trial 4. Freeville, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US #1 1⅞-4	% Kat Yield 1⅞-4	% of Total Yield US No. 1 1⅞-2½	% of Total Yield US No. 1 2½-3¼	% of Total Yield US No. 1 3¼-4	% of Total Yield US No. 1 >4	% of Total Yield Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	App[6]	Vine[7] Mat
BR5991-WV16	525	497	120	13	49	33	0	4	6.8	79	4	7.3	8.3
B6043-WV6	557	489	118	12	57	19	1	11(S)	6.5	74	2	8.0	9.0
Michibonne	523	463	112	8	45	36	2	9(S)	7.7	74	3	6.8	5.5
Michimac	490	447	108	13	58	21	0	8(S)	6.1	71	0	7.0	4.5
B8086-3	486	442	107	15	53	24	1	7	5.9	77	2	7.0	2.5
Denali	470	429	104	15	57	19	2	7	6.2	91	2	7.3	7.8
Kennebec	562	428	103	8	45	24	1	22(S)	8.3	79	1	6.0	6.3
Monona	434	414	100	14	63	18	1	3	6.1	68	0	7.0	3.0
Katahdin	526	414	100	7	43	28	3	24(S)	7.7	75	0	6.0	6.0
AF92-3	453	404	98	16	62	11	0	9	6.1	70	1	6.3	3.5
Wauseon	463	396	96	13	49	23	1	13(S)	6.2	72	0	7.0	4.5
B7151-4	457	382	92	9	42	33	2	14(S)	7.7	89	6	6.3	6.3
Shepody	464	380	92	15	52	15	1	16(S)	8.0	81	9	6.3	3.5
B8799-8	326	305	74	11	61	22	1	5	6.9	78	0	8.5	1.0
Simcoe	311	300	73	17	67	13	0	2	5.4	84	0	8.3	6.0
Waller-Duncan (.05)	(64)	(69)							(0.7)	(4)			

[1] Planted May 14, vines sprayed with 1.6 lbs/A ametryn September 10 and 2.5 lbs/A dinoseb September 15, harvested September 30, within row spacing 9.7". See footnote 1, Table 2.

[2]-[6] See appropriate footnotes, Table 2.

[7] Vines rated September 8. See footnote 7, Table 2.

Upstate New York Table 6. Variety Trial 5. Freeville, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US #1 1⅞-4	% Kat Yield 1⅞-4	% of Total Yield US No. 1 1⅞-2½	% of Total Yield US No. 1 2½-3¼	% of Total Yield US No. 1 3¼-4	% of Total Yield US No. 1 >4	% of Total Yield Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	App[6]	Vine[7] Mat
Katahdin	441	406	100	10	50	32	1	6	6.6	84	1	6.5	6.5
B8710-1	454	403	100	11	59	19	0	10	6.9	72	1	6.3	2.3
B9340-3	443	394	97	8	41	40	3	7	7.3	75	0	6.3	3.8
B8798-20	404	389	96	14	51	31	0	2	6.4	84	2	7.8	5.0
B8771-6	420	377	94	10	41	38	4	5	7.2	80	0	7.3	4.0
B9335-34	382	361	89	8	51	36	0	5	7.6	73	0	6.3	5.5
B8514-8	391	358	88	11	53	28	1	6	6.9	85	0	7.8	2.0
B9340-13	405	357	88	12	49	27	0	10(S)	7.6	76	0	7.0	2.0
B9473-2	374	356	88	17	59	20	0	2	5.5	65	1	8.0	1.3
B9336-27	373	354	88	20	68	8	0	3	6.2	83	0	7.3	4.3
Atlantic	431	347	86	11	44	25	8	10	6.9	95	0	7.0	5.5
B9384-6	415	335	83	10	38	32	4	13(GC)	6.7	70	1	6.8	2.3
B9285-3	388	328	81	13	38	33	2	12	6.7	81	0	7.0	3.5
B8799-13	336	313	78	11	55	26	1	4	6.8	88	2	7.0	4.5
B9384-4	335	308	76	23	57	12	0	5	5.1	73	0	7.3	1.5
B9335-60	332	286	71	20	47	19	1	11	5.8	75	3	7.0	1.8
B9332-1	334	281	70	16	46	22	0	13(S)	6.0	82	0	7.3	4.3
B9335-17	321	279	69	39	38	10	0	6	4.4	76	0	7.8	1.8
Waller-Duncan (.05)	(49)	(54)							(0.8)	(3)			
Other[8]													
B9335-7	396	336	98	17	49	19	0	13(GC)	5.8	78	1	8.0	3.7
B9340-7	366	318	78	13	65	9	0	12(GC)	5.7	82	1	8.0	4.0
B9286-1	338	282	70	14	53	17	1	14(GC)	6.6	66	0	7.0	1.3

1/ Planted May 8, vines sprayed with 1.6 lb/A ametryn September 1 and 2.5 lbs/A dinoseb September 10, harvested September 15, within row spacing 9.6". See footnote 1, Table 2.

2/-6/ See appropriate footnotes, Table 2.

7/ Vines rated August 27. See footnote 7, Table 2.

8/ Not included in analysis of variance. Thirty tubers examined for hollow heart and/or brown center for B9286-1 and B9335-7, twenty tubers examined for B9340-7.

Upstate New York Table 7. Variety Trial 6. Russet Variety Trial, Freeville, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US#1 4-16 oz	% R.B. Yield 4-16 oz	% of Total Yield US No. 1 0-4	% of Total Yield US No. 1 4-10	% of Total Yield US No. 1 10-16	% of Total Yield US No. 1 >16	Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	App[6]	Vine[7] Mat
Lemhi	362	279	140	14	64	14	2	7	5.5	93	9	7.5	5.0
B9400-5	357	278	140	12	51	28	7	2	7.1	72	1	6.8	4.8
B9391-2	349	267	133	17	51	25	4	4	5.9	75	5	6.8	2.8
B9395-7	331	266	134	9	53	28	4	7	6.4	69	0	6.5	2.0
B9395-25	302	221	112	18	57	17	2	7	5.4	76	0	7.3	2.0
BelRus	296	215	109	25	65	9	1	2	4.5	81	0	8.0	2.3
B9395-3	329	212	106	25	54	10	2	9	5.1	71	1	7.3	2.3
B9020-18	319	210	110	16	46	20	6	13(GC)	5.8	66	0	5.8	2.0
R.Burbank	348	203	100	24	47	12	1	17(M)	5.2	87	4	5.5	7.0
Highlat R.	254	147	74	24	46	11	2	16(GC)	4.5	68	2	6.5	1.8
Waller-Duncan(.05)	(55)	(47)							(1)	(3)			
Other[8]													
B9399-23	333	242	119	21	53	17	2	3	5.9	74	3	7.3	2.5

[1] Planted May 7, vines sprayed with 1.6 lbs/A ametryn September 1 and 2.5 lbs/A dinoseb September 10, harvested September 14, within row spacing 9.8". See footnote 1, Table 2.

[2]-[6], [8] See appropriate footnotes, Table 2.

[7] Vines rated August 27. See footnote 7, Table 2.

Upstate New York Table 8. Wayne County Russet Variety Trial, Savannah, New York, 1981.

Clone[1]	Yield (cwt/A) Total	Yield (cwt/A) US #1 4-16 oz	% of Total Yield US No. 1 ounces 0-4	% of Total Yield US No. 1 ounces 4-16	% of Total Yield US No. 1 ounces >16	Defects[2]	Spec[4] Grav	HH[5]
BelRus	286	282	15	75	8	2	68	0
R. Burbank	379	242	9	65	17	10(M)	73	14
Lemhi R.	353	214	9	80	8	3	76	23
Waller-Duncan(.05)	(72)	(ns)					(ns)	

[1] Planted May 4, 1981, harvested September 25, 1981, 1200 lb/A of 15-15-15 applied in bands at time of planting, vines sprayed with dinoseb in early September.

[2], [4], [5] See appropriate footnotes, Table 2.

Upstate New York Table 9. Steuben County White Variety Trial, Cohocton, New York, 1981.

Clone[1/]	Yield (cwt/A)		% Kenn Yield	% of Total Yield				
		US#1		US No. 1				
	Total	1 7/8-4	1 7/8-4	<1 7/8	1 7/8-4	>4	Defects[2/]	HH[5/]
BR7093-23	382	340	121	9	89	1	1	8
Belchip	394	340	121	7	86	2	5	13
Chipbelle	379	338	120	9	89	0	1	9
F69026	380	335	119	8	89	0	3	2
Norchip	411	332	118	17	81	0	2	8
AF186-5	371	327	116	10	88	1	1	6
Monona	382	326	116	15	85	0	0	13
Atlantic	366	318	113	11	87	0	2	11
Rosa	378	298	106	18	79	4	0	10
Denali	352	296	105	10	84	1	5	11
Kennebec	360	281	100	6	79	2	14(GC)	3
C7232-4	293	261	93	9	89	0	2	0
Waller-Duncan (.05)	(ns)	(ns)						
Other[3/]								
Simcoe	350	316	113	9	90	0	1	4

1/ Planted May 19, harvested November 2, within row spacing 9", between row spacing 36".

2/, 5/ See appropriate footnotes, Table 2.

3/ Not included in analysis of variance. Thirty tubers examined for hollow heart and/or brown center.

Upstate New York Table 10. Wayne County White Variety Trial, Savannah, New York, 1981.

Clone[1/]	Yield (cwt/A)		% Kat Yield	% of Total Yield					
		US #1		US No. 1				Spec[4/]	
	Total	1 7/8-4	1 7/8-4	<1 7/8	1 7/8-4	>4	Defects[2/]	Grav	HH[5/]
Belchip*	492	425	109	6	86	1	7	78	5
Wauseon*	466	391	101	8	83	3	5	67	1
Katahdin	498	389	100	3	79	7	11	66	5
Monona	427	386	99	5	90	2	2	64	1
Peconic*	457	373	96	11	81	1	7	82	0
Norchip*	438	369	95	12	84	0	4	74	1
Rosa*	429	366	94	12	85	0	3	74	4
Denali*	407	359	92	4	88	2	6	88	7
Atlantic	382	341	88	7	89	1	3	79	1
Chipbelle*	399	330	85	9	83	0	9	86	13
Hudson	374	315	81	6	83	2	10	64	0
Jemseg	347	294	76	5	85	3	7	64	0
C7232-4	310	274	70	10	88	1	1	68	0
Waller-Duncan (.05)	(102)	(ns)						(2)	

* Not included in analysis of variance. Values are the average of 3 replications (part of the 4th replication was under water). Thirty tubers cut for hollow heart evaluation.

1/ Planted May 4, 1981 vines sprayed with dinoseb in early September, harvested September 25, 1200 lb/A of 15-15-15 applied in bands at time of planting, within row spacing 9", between row spacing 36".

2/, 4/, 5/ See appropriate footnotes, Table 2.

Upstate New York Table 11. Effect of nitrogen rate on yield and quality of Rosa, Freeville, New York, 1981.

N rate[1] (lb/A)	Tuber No. per ft.	Yield (cwt/A) Total	Yield (cwt/A) US#1 1⅞-4	% of Total Yield US No. 1 1½-1⅞	1⅞-2½	2½-3¼	3¼-4	>4	Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	Vine[7] Mat
50	7.5	329 a	299 a	4	30	58	3	0	5	4.6 a	79	22	2.0
100	8.3	372 ab	342 a	3	27	57	8	0	6	4.7 a	78	18	3.7
150	8.4	405 b	358 ab	3	24	57	7	0	9(S)	5.1 b	77	15	4.3
200	8.8	432 c	386 b	2	24	57	8	0	9(S)	5.2 b	75	14	6.8
Duncan[8] (.05)	ns										ns		

Upstate New York Table 12. Effect of nitrogen rate on yield and quality of Chipbelle and AF186-5, Freeville, New York, 1981.

Clone and N rate[1] (lb/A)	Tuber No. per ft.	Yield (cwt/A) Total	Yield (cwt/A) US#1 1⅞-4	% of Total Yield US No. 1 1½-1⅞	1⅞-2½	2½-3¼	3¼-4	>4	Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	Vine[7] Mat
Chipbelle													
50	5.4	286	248	6	26	48	13	0	8	5.6	89	30	2.5
100	5.5	292	246	4	26	50	9	1	11(S)	5.6	92	22	3.3
150	6.0	333	283	5	20	52	13	1	10(S)	5.9	91	21	4.0
200	6.2	356	306	3	19	55	12	0	11(S)	6.0	94	27	5.5
AF186-5													
50	4.7	240	222	4	20	64	8	0	4	5.3	77	15	1.3
100	6.1	308	293	3	24	61	11	0	2	5.3	78	9	2.3
150	6.1	343	322	2	17	62	16	1	4	5.9	78	13	3.8
200	6.6	351	318	3	18	59	13	1	6	5.5	77	16	4.8
Significance Level * = 5%, ** = 1%													
N rate x clone	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		
Clone	ns	ns	ns	*	ns	**	ns	ns	**	ns	**		
N rate means													
50	5.1	263	235	5	23	56	11	0	6	5.4	83	23	1.9
100	5.8	300	270	3	25	56	10	0	7	5.4	85	15	2.8
150	6.0	338	303	3	18	57	14	1	7	5.9	84	17	3.9
200	6.4	353	312	3	18	57	13	0	8	5.8	87	22	5.1
Waller-Duncan (.05)	(1.6)	(22)	(28)	ns	(4)	ns	ns	ns	ns	ns	ns		

1/ Planted May 15, vines sprayed with 1.6 lb/A ametryn September 10 and 2.5 lb/A dinoseb September 15, harvested September 28, within row spacing 10" for Rosa, 8" for Chipbelle and AF186-5, fertilizer banded at time of planting. Experimental design for Rosa a randomized complete block, for Chipbelle and AF186-5 a split plot where N rate is the main effect and variety the subplot.

2/-4/ See appropriate footnotes, Table 2.

5/ Total number of tubers with hollow heart and/or brown center of 40 tubers cut for all except Rosa 100 lb/A which had 30 tubers cut.

7/ Vines rated on September 8. See footnote 7, Table 2.

8/ Duncan's multiple range test. Numbers with the same letter are not significantly different from each other.

Upstate New York Table 13. Effect of row arrangement, spacing and nitrogen rate on yield and quality of BelRus, Freeville, New York, 1981.

Row arrangement, spacing, N rate (lb/A)[1]	Tuber No. per ft	Tuber No. per plot	Yield (cwt/A) Total	Yield (cwt/A) US #1 4-16 oz	% of Total Yield US No. 1 0-4	4-10	10-16	>16	Defects[2]	MTW[3] (oz)	Spec[4] Grav	HH[5]	Vine[7] Mat
2 Row													
9" 150	7.4	230	274	192	25	57	13	2	4	4.5	71	5	2.8
9" 200	6.5	221	275	198	25	61	10	1	3	4.7	67	4	3.3
12" 150	5.7	192	262	193	19	62	12	2	6	5.1	71	6	2.8
12" 200	6.1	207	267	185	25	58	11	1	6	5.0	70	3	2.8
3 Row													
9" 150	5.2	256	249	141	42	55	1	0	2	3.7	70	1	2.0
9" 200	4.8	246	253	150	40	56	3	0	1	3.8	70	2	2.8
12" 150	5.1	259	273	180	32	60	5	0	2	3.9	70	2	1.8
12" 200	4.9	250	275	174	25	57	6	0	3	4.1	69	1	2.8
Significance Level within sources of variation * = 5%, ** = 1%													
Rep	ns	ns	**	*	ns	ns	ns	ns	ns	ns	*		*
Arr	*	ns	ns	*	**	ns	ns	ns	ns	ns	ns		ns
Sp	ns	ns	ns	ns	**	ns	ns	ns	ns	*	ns		ns
Arr x Sp	ns	ns	*	*	ns	ns	ns	ns	ns	ns	ns		ns
N rate	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		**
Arr x N rate	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
Sp x N rate	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
Arr x Sp x N rate	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
Rep													
1			251	178							69		2.3
2			265	163							67		1.8
3			245	157							66		2.0
4			303	209							77		4.4
Arr													
2	6.1			192	23								
3	5.0			161	37								
Sp													
9					33					4.2			
12					28					4.5			
Arr x Sp													
2 9"			275	195									
2 12"			265	189									
3 9"			251	145									
3 12"			274	177									
N rate													
150													2.3
200													2.9
Arr x N rate													
2 150													2.8
2 200													3.0
3 150													1.9
3 200													2.8

1/ Experimental design a split-split plot where main plot is row arrangement, subplot is spacing within row and sub-sub plot N rate. Planted May 26, harvested September 16. A three row planter used to open furrows and band fertilizer at 150-300-300 lbs/A prior to handplanting the seed pieces. The 200 lbs/A N achieved by sidedressing an additional 50 lbs/A N at 6" stage. Between row spacing for 3 row plots is 18" and 2 row plots 36".

2/-5/ See appropriate footnotes, Table 2.

7/ Vines rated September 8. See footnote 7, Table 2.

Upstate New York Table 14. 1980 Potato Variety Trials[1/], Freeville, New York. Chip Color Results[2/]

Clone	Trial I		Trial II		Trial III	Trial IV		Red		Russet	Wyoming	
	50	45-60	50	45-60	50	50	45-60	50	45-60	50	Wh 50	Russ 50
Atlantic			48	52							54	
Belchip			45	52							54	
BelRus										39		44
Chieftain								36				
Crystal			44	40								
Dakchip			40									
Denali			41								52	
Jemseg					45						31	
Katahdin	39		38			40					42	
Michibonne			31									
Michimac			37									
Monona			50	54							56	
Norchip			42	46							54	
Norland								44	32			
Rideau								46	45			
Rosa	53	49									56	
R.Burbank										40		40
Superior					54							
Trent					57							
A68678-1										45		42
AF186-5			43	44							56	
B6987-184						53	52				56	
B7151-4						52	52					
B7583-6										42		39
B7592-1						49	54				49	
B7805-1						26						
B8491-1						49	52					
B8491-24					44							
B8514-8						42	43					
B8706-7*						47	42					
B8715-22					46							
B8751-6					46							
B8771-6					53							
B8783-1						33						
B8783-6					58							
B8798-20						51	43					
B8799-8					58							
B8832-3						38						
B8881-5										42		
B8887-1					53							

(Cont'd next page)

Upstate New York Table 14. (Continued)

Clone	Trial I		Trial II		Trial III	Trial IV		Red		Russet	Wyoming	
	50	45-60	50	45-60	50	50	45-60	50	45-60	50	Wh 50	Russ 50
B8922-10										27		
B8934-4										49		
B8943-4										35		
B8977-2										39		
B8983-5						44	44					
B9016-20						27						
B9019-14						35						
B9020-18										33		
B9062-5					49							
B9097-5					58							
B9099-5						43	37					
BR7093-23			45	53							51	
C7232-4					59							
CA02-7			41									
ND146-4R								49	37			
ND9403-16R								57	53			
NY59	30											
NY63	27											
NY66	46	47										
Q54-6	37											
Q54-11											42	
Q155-3	49	58									53	
R471-62											39	
S374-4	32	37										
S376-1	47	51										
S376-2	52	46										
S377-8	40											
S377-41	39											
$D_{(.05)}$ Tukey	(10)	(11)	(8)	(9)	(6)	(8)	(10)	(10)	(9)	(9)	(10)	(10)

* Not included in analysis of variance.

1/ See 1979-1980 report for harvest results.

2/ Agtron M30 colorimeter readings. Standards for whole chips were discs 00 and 90 which were calibrated to give readings of 0 and 90 respectively. Minimum value for "generally acceptable color" for whole chips is about 45. Two slices of each of seventeen tubers per replication were fried in vegetable oil at 365°F. Variety Trial III samples were fried 9/11/80, one week after harvest. Other 50°F samples were stored at 50°F from time of harvest until fried 1/14/81. The 45-60°F samples were stored at 45°F from time of harvest until 2/18/81 when the temperature was raised to 60°F. Samples were fried on 3/19/81.

Upstate New York Table 15. 1980 Potato Variety Trials, Freeville, New York, After-cooking Darkening[1/] and Weight Loss Results[2/]

Clone	After-cooking darkening, Variety Trial Number								Sprout weight or weight loss other than sprouts expressed at % of total weight, Variety Trial Number									
							Wyoming		I		II		IV		Red		Russet	
	I	II	III	IV	Red	Russ	Wh	Russ	Spr	Oth	Spr	Oth	Spr	Oth	Spr	Oth	Spr	Oth
Atlantic		4.8					4.6				2.6	8.7						
Belchip		5.0					4.9				3.6	10.0						
BelRus						4.5		5.0									3.1	10.6
Chieftain					4.9										2.1	5.7		
Crystal		4.9									2.3	7.5						
Dakchip		4.8									10.3	16.0						
Denali		4.5					4.1				2.6	7.7						
Jemseg			4.9				4.6											
Katahdin	5.0	4.8		4.3			4.3		2.2	6.5	2.1	7.9	1.6	9.4				
Michibonne		5.0									1.0	8.7						
Michimac		4.8									2.0	7.5						
Monona		5.0					4.8				2.6	9.0						
Norchip		4.4					4.1				3.0	11.2						
Norland					3.8										6.6	7.6		
Rideau					4.7										2.8	11.8		
Rosa	4.9						4.6		1.7	11.8								
R.Burbank						4.8		5.0									0.0	5.4
Superior			5.0															
Trent			5.0															
A68678-1						4.1		4.7									1.3	8.1
AF186-5		4.5					4.5				4.8	9.6						
B6987-184				4.6			4.3						2.5	6.7				
B7151-4				5.0									0.7	10.1				
B7583-6						3.2		4.0									0.2	4.5
B7592-1				5.0			5.0						1.0	6.4				
B7805-1				4.8									0.9	8.1				
B8491-1			5.0	4.9									0.1	8.1				
B8491-24																		
B8514-8				4.8									0.5	10.8				
B8706-7																		
B8715-22			4.8															
B8751-6			4.9															
B8771-6			4.6															
B8783-1			5.0										1.5	8.5				
B8783-6				4.6														
B8798-20				4.3									1.1	7.3				
B8799-8			4.8															
B8832-3				5.0									3.0	5.8				
B8881-5						4.7											1.9	7.2
B8887-1			4.2															

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Upstate New York Table 15. (Continued)

Clone	After-cooking darkening								Sprout weight or weight loss other than sprouts expressed at % of total weight									
	Variety Trial Number								Variety Trial Number									
							Wyoming		I		II		IV		Red		Russet	
	I	II	III	IV	Red	Russ	Wh	Russ	Spr	Oth	Spr	Oth	Spr	Oth	Spr	Oth	Spr	Oth
B8922-10						4.3											2.4	10.3
B8934-4						3.7											0.7	10.5
B8943-4						4.7											0.3	5.7
B8977-2						4.4											0.9	8.8
B8983-5				4.5									2.7	8.1				
B9016-20				4.5									4.5	10.4				
B9019-14				4.9									6.1	7.8				
B9020-18						3.0											3.9	12.2
B9062-5			4.8															
B9097-5			4.8															
B9099-5				5.0									3.7	7.4				
BR7093-23		4.7					4.7				0.4	8.0						
C7232-4			4.8															
CA02-7		4.9									0.4	8.4						
ND146-4R					4.0										5.9	9.5		
ND9403-16R					4.9										0.6	5.7		
NY59	5.0								0.6	6.8								
NY63	5.0								0.9	6.1								
NY66	5.0								1.4	8.0								
Q54-6	5.0								1.4	6.4								
Q54-11							4.6											
Q155-3	4.8						4.1		1.1	6.2								
R471-62							4.2											
S374-4	5.0								0.0	6.4								
S376-1	4.8								1.1	7.2								
S376-2	5.0								2.2	6.8								
S377-8	5.0								0.3	7.8								
S377-41	4.9								2.4	7.0								
$D_{(.05)}$ Tukey	(ns)	(0.5)	(0.5)	(0.5)	(0.5)	(1.1)	(0.9)	(0.3)	(0.7)	(5.1)	(1.3)	(3.5)	(0.9)	(6.9)	(1.4)	(4.3)	(1.1)	(4.3)

1/ On 1/23/81 five tubers per each replication were peeled, dipped in 0.5% sodium bisulfite, cooked 7 min. in an autoclave at 15 p.s.i. and rated from 1-5, where 1=severe after-cooking darkening, 5=no darkening.

2/ Stored at 50°F from time of harvest. Data collected 3/6/81.

NEW YORK

R. L. Plaisted and H. D. Thurston[1]

New York Breeding Program

Crossing and Seedling Production. This year 65 crosses were made for variety selection purposes. These all segregate for resistance to the golden nematode, and several will segregate for resistance to scab, PVX, PVY, and late blight. Four hundred crosses were made in the program to develop a neotuberosum population, 39 were made to improve resistance to root knot nematodes and bacterial wilt, and several hundred produced in the glandular trichome project. We transplanted 114,000 seedlings to pots which yielded 87,368 tubers of the largest size. The single hills were planted near Lake Champlain at Willsboro, New York. Harvest was very difficult due to the 12 inches of rain that fell during the harvest season. Another 8,000 were planted at Ithaca. A total of 5,800 were selected, but many of these will be discarded at cutting time.

Early Generation Selections. The third generation, four hill plots, consisted of 5,157 clones, of which 605 were selected and are being tested for golden nematode resistance. The fourth generation had 373 clones of which 102 have been saved after the cooking and chipping trials. The fifth generation had 90 clones which were grown in yield trials at Ithaca and Riverhead in an observation trial at Freeville. Thirty-three clones survived those trials (Table 1), but three will be discarded based on the scab trial. Thirteen clones were evaluated in the sixth generation and six survived to date (Table 2).

Advanced Selections. The performance of these clones is given in Table 3. NY 59 has been a high yielding clone with excellent resistance to golden nematode, late blight, Verticillium wilt, and early blight. However, heat necrosis prevents its use on Long Island and poor chip color and lateness are limitations upstate. Farm scale trials will be conducted to evaluate the future of this clone. NY63 is a Katahdin type that is especially promising on Long Island. It has nematode and V. wilt resistance. It appears to be more susceptible to scab than Katahdin, but no worse than Chippewa. NY67 has excellent V. wilt resistance as well as nematode resistance. NY68 is an early clone with nematode resistance. All three were grown on farm demonstrations in Long Island and will be repeated in 1982. The two S377 clones are both very attractive with nematode and scab resistance. Both are subject to small tuber size.

[1] In cooperation with Anderson, Brodie, Ewing, Fry, Jones, Sieczka, and Tingey.

N.Y. Table 1. First Year Yield Trial Selections - 1981.

Clone	Loc.	GN	Scab	cwt/A >1 7/8	cwt/A >2 1/2	% >2 1/2	#/20 hht.	#/20 int. necr.	Appear. Score	Avg. 2 yr. SG
Katahdin	I	S	43	389	325	84	2	0	3.3	1.078
	R			268	188	70	0	1	3.3	
U688-1	I	R	53	358	293	82	0	3	3.4	1.067
	R			294	207	70	0	0	3.0	
U689-5	I	R		471	379	81	0	0	3.3	1.066
	R			300	143	48	0	0	3.1	
U694-1	I	R		407	348	85	0	0	3.3	1.073
	R			242	157	65	0	0	3.3	
U697-1	I	R	120	354	287	81	0	1	3.8	1.068
	R			302	205	68	0	0	3.8	
U699-1	I	R		426	326	75	0	0	2.9	1.075
	R			325	208	64	0	0	3.4	
U699-5	I	R	19	359	264	74	1	0	3.6	1.074
	R			258	124	48	0	0	3.5	
U699-19	I	R		390	257	66	1	0	3.6	1.064
	R			273	166	61	0	0	3.0	
U709-3	I	R	39	447	388	87	0	1	4.8	1.073
	R			403	295	73	0	0	4.0	
U710-2	I	R		371	298	80	0	0	3.0	1.074
	R			224	95	42	0	2	3.5	
U711-24	I	R	80	359	279	78	0	1	3.5	1.067
	R			268	167	62	0	0	3.8	
U713-23	I	R	176	378	244	65	0	0	3.2	1.083
	R			298	172	58	0	0	2.7	

Table 1 (cont.)

Clone	Loc.	GN	Scab	cwt/A >1 7/8	cwt/A >2 1/2	% >2 1/2	#/20 hht.	#/20 int. necr.	Appear. Score	Avg. 2 yr. SG
U715-12	I	R	25	444	368	83	4	0	3.9	1.077
	R			349	238	68	0	1	3.6	
U715-52	I	R		362	237	65	0	0	3.8	1.077
	R			282	134	48	0	0	3.9	
U715-64	I	R	44	290	133	46	0	0	3.5	1.084
	R			341	170	50	0	1	4.0	
U715-94A	I	R	21	403	320	79	0	1	4.0	1.083
	R			335	244	73	0	0	3.7	
U723-8	I	R	24	383	310	81	1	0	4.5	1.072
	R			367	274	75	1	2	4.2	
U723-19	I	R		347	271	78	0	0	4.0	1.077
	R			284	193	68	0	0	4.0	
U723-29	I	R	16	406	343	85	0	0	3.0	1.071
	R			362	274	76	0	0	3.2	
U725-1	I	R		401	291	73	0	0	3.9	1.079
	R			286	156	55	0	3	3.6	
U729-15	I	R	26	406	294	72	1	0	2.9	1.084
	R			366	207	57	0	1	3.1	
U729-21	I	R	33	431	278	64	0	0	4.1	1.068
	R			280	132	47	0	0	3.1	
U741-12	I	R		378	305	81	0	0	3.9	1.082
	R			328	205	63	0	0	3.7	
U741-20	I	R	37	376	190	51	0	0	3.5	1.072
	R			249	136	55	0	0	3.4	
U741-27	I	R	137	382	325	85	0	1	3.6	1.066
	R			304	198	65	0	6	4.0	

Clone	Loc.	GN	Scab	cwt/A >1 7/8	cwt/A >2 1/2	% >2 1/2	#/20 hht.	#/20 int. necr.	Appear. Score	Avg. 2 yr. SG
U741-49	I	R	22	342	307	90	0	2	4.0	1.075
	R			232	173	75	0	0	4.0	
U754-9	I	R	9	360	288	80	2	0	3.5	1.068
				289	221	76	1	0	4.0	
U756-31	I	R	4	385	298	78	0	0	3.4	1.077
	R			333	243	73	0	1	3.5	
U756-38	I	R	54	458	415	91	0	0	3.5	1.069
	R			252	177	70	0	0	4.2	
U768-6	I	R		454	346	76	0	1	3.4	1.076
	R			298	172	58	2	0	3.5	
CS759-1R	I	R	42	304	218	72	0	0	4.0	1.080
	R			295	180	61	0	1	3.8	
CS7619-9	I	R	21	427	357	86	0	0	3.0	1.085
	R			344	268	78	0	0	3.0	
CS7638-22	I	R	24	339	253	75	0	2	3.9	1.075
	R			287	209	73	0	0	4.3	
CS7685-6	I	R	51	392	314	80	1	0	3.6	1.078
	R			312	218	70	0	0	3.5	

Loc.: I = Ithaca
R = Riverhead

GN : R = resistant

Scab: Index of scab relative to Chippewa

Score: 1 to 5, 5 most attractive

N.Y. Table 2. Second Year Yield Trial Selections - 1981.

Clone	Loc.	Total	>1 7/8	>2 1/2	% >2 1/2	Score	hht.	int. necr.	SG	VW	Scab	LB	GN
Katahdin	I	446	422	343	81	3.25	8/50	2/50	1.077	3.4	43	4.8	S
	R	345	317	223	70	3.5	0/60	6/60					
	C		331	282	85	3.8	3/30	0/20					
	EH	194	168	96	57	3.1							
T4-20	I	359	349	293	84	3.3	4/50	5/50	1.073	4.0	63	4.0	R
	R	208	187	91	49	3.5	0/30	0/30					
	C		325	290	89	3.4	2/30	1/30					
	EH	214	200	136	68	3.3							
T11-29	I	455	445	366	82	3.6	1/50	0/50	1.080	4.2	70	5.0	R
	R	350	318	183	57	3.3	1/30	0/30					
	C		370	306	83	3.9	1/30	0/30					
	EH	293	266	145	55	3.4							
T20-5	I	472	458	376	82	3.7	1/50	0/50	1.065				R
	R	342	309	164	53	3.3	0/30	6/30					
	C		420	356	82	3.5	3/30	0/30					
T30-36	I	468	453	364	80	3.6	0/50	0/50	1.072	5.4	3	6.5	R
	R	385	350	180	51	3.6	0/30	3/30					
	C		324	236	72	3.7	1/30	0/30					
	EH	290	253	129	51	3.3							
T37-29	I	478	461	342	74	3.9	1/50	4/50	1.071	4.0	69	5.8	R
	R	397	357	177	50	4.2	0/50	8/30					
	C		476	402	85	4.5	3/30	0/30					
	EH	346	295	136	46	3.8							
T53-26	I	436	430	355	82	3.6	1/50	0/50	1.080	2.6	10	4.0	R
	R	275	243	156	64	3.3	0/30	4/30					
	C		429	376	88	3.9	1/30	1/30					
	EH	237	203	86	42	3.2							

Table 2 (cont.)

Clone	Loc.	Total	>1 7/8	>2 1/2	% >2 1/2	Score	hht.	int. necr.	SG	VW	Scab	LB	GN
T88-6	I	468	449	314	70	3.8	0/50	0/50	1.072	5.8		5.8	R
	R	365	332	188	57	4.0	0/30	0/30					
	C		270	212	78	4.6	0/30	0/30					
	EH	306	266	121	45	3.2							
Superior	R	318	295	181	61	3.0	1/30	3/30					S
	EH	267	247	123	48	3.0							

Loc.: I = Ithaca
R = Riverhead
C = Cato
EH = Early harvest, 87 days to vine kill

VW: Verticillium wilt. 7 = most susceptible

Scab: Index relative to Chippewa

LB: Late blight. 8 most susceptible

GN: Golden nematode. R is resistant

N.Y. Table 3. Advanced Selections - 1981

Clone	Loc.	cwt/A Total	cwt/A >1 7/8	cwt/A >2 1/2	% >2 1/2	Score	hht.	int. necr.	SG	VW	Scab	LB	GN
Katahdin	I	415	401	329	82	6.4	26/150	4/150	1.077	3.4	43	4.8	S
	R	306	278	183	65	7.0	0/120	5/120					
	C		331	282	85	7.6	3/30	0/30					
	EH	194	168	96	57	6.2							
Rosa	I	418	391	234	60	7.4	2/90	1/90	1.077	2.6		3.8	R
	R	361	219	80	37	7.9	0/60	4/60					
	C		434	320	74	7.5	3/30	0/30					
	EH	275	230	89	39	7.0							
Monona	I	378	368	296	80	3.8	13/100	5/100	1.073	3.8			S
	R												
	C		327	292	89	4.7	0/30	0/30					
	EH	217	194	112	58	6.0							
Superior	I	376	357	277	78	5.8	1/90	1/90	1.075		9		S
	R	308	280	135	48	5.5	3/60	1/60					
	C												
	EH	267	247	123	48	6.0							
Norchip	I	387	368	264	72	5.2	2/90	0/90	1.078	3.4			S
	R												
	C		290	229	79	5.3	1/30	0/30					
NY59	I	387	371	311	84	6.5	3/130	0/130	1.081	2.2	39	3.0	R
	R												
	C		378	323	86	7.7	0/30	0/30					
	EH	211	190	110	58	6.5							
NY63	I	395	386	323	84	7.4	14/120	1/120	1.071	2.2	97	4.5	R
	R	299	274	170	62	7.8	0/60	4/60					
	C		342	293	86	8.3	1/30	0/30					
	EH	254	235	147	62	6.8							

Table 3 (cont.)

Clone	Loc.	cwt/A Total	cwt/A >1 7/8	cwt/A >2 1/2	% >2 1/2	Score	hht.	int. necr.	SG	VW	Scab	LB	GN
NY67	I	351	335	243	73	7.3	1/100	0/100	1.078	1.2		5.5	R
	R	257	221	127	57	7.8	0/60	0/60					
	C		315	264	83	7.3	0/30	0/30					
	EH	189	160	65	41	6.0							
NY68	I	388	377	287	76	6.7	0/80	4/80	1.073	5.8	53	5.8	R
	R	281	249	109	44	6.8	0/60	0/60					
	C		276	212	76	6.8	0/30	1/30					
	EH	254	235	153	65	6.2							
S377-8	I	412	394	298	76	8.5	3/100	0/100	1.063	5.0	23	5.5	R
	R	301	266	104	39	8.1	0/60	0/60					
	C		381	287	75	9.5	3/30	1/30					
	EH	260	231	104	45	7.8							
S377-41	I	419	405	275	68	8.6	14/110	0/110	1.075	3.6	4	4.8	R
	R	285	240	70	29	8.0	0/60	1/60					
	C		332	250	75	8.2	2/30	0/30					
	EH	237	197	81	41	6.8							

Loc.: I = Ithaca
R = Riverhead
C = Cato
EH = Early harvest, 87 days to vine kill

VW: Verticillium wilt. 7 = most susceptible

Scab: Index relative to Chippewa

LB: Late blight. 8 most susceptible

GN: Golden nematode. R is resistant

NORTH CAROLINA

F. L. Haynes

Breeding Program

The objectives of the program are early maturity, scab resistance, processing quality and adaptation to the Tidewater area. This includes adaptation to the peculiar environmental stresses encountered in planting around March 1st in cold, wet soils and harvesting during June under high soil and air temperatures. Processing quality is essential since less than 20 percent of the crop enters the market for consumption as table stock.

Eastern Trials. Three locations in the early commercial area were planted to performance trials of selected clones. The results are presented in N.C. Tables 1, 2, and 3. Pungo continued to produce superior yields but was again susceptible to heat sprouting at all locations. Atlantic and Belchip produce acceptable yields and are more dependable as chipping varieties than Pungo. Atlantic suffered from internal browning (heat necrosis) to varying degrees at all locations. No breeding lines were consistently superior to these varieties in 1981.

Seedling Production and Clonal Maintenance. Clonal maintenance and increase from tuber-indexed seed tubers was conducted at the Waynesville Station, in the mountains. The summer hybridization program was conducted at the same station.

Adaptation and Diploid Breeding

The diploid breeding and adaptation project was continued. The interbreeding PHU-STN base population and the various sub-populations were advanced.

Heat Tolerance - Selected superior clones from field evaluations (described in the 1980 Report) for heat tolerance were planted in isolation in a design to promote random mating. This population produced 40 seed families (based on maternal parents) which will be screened for increase in tolerance to high temperatures. The parent clones will also be re-evaluated.

High Tuber Dry Matter. To provide a population for fourth cycle recurrent selection for high specific gravity, 165 selected third-cycle clones were planted in an isolated crossing block. Included were clones which had both high specific gravity and stability for high specific gravity under high temperatures. The planting was designed to promote random mating. The 165 families (based on maternal parents) will be screened for high dry matter and improved tuber production.

A planting was grown of 6000 seedlings (100 seedlings x 60 families) from seed produced in 1980 in a seed nursery similar to that just described. The 60 parent clones had been selected for high specific gravity. From this planting, 149 segregates were selected on the basis of superiority of tuber type and yield. Tuber yield ranged from 0.9 to 2.1 pounds per plant.

Specific gravity was determined for the selected clones. The results were:

Specific gravity of	1.100 or greater	56 clones
" "	" 1.095 - 1.099	27 "
" "	" 1.094 or less	66 "

From preliminary examination, it appears that yield, tuber type and specific gravity were advanced, although the greatest gain was in yield.

Early Blight Resistance - In 1980 a program of evaluation for early blight resistance was initiated. A population of 4,000 diploid seedlings from the base population was inoculated and evaluated for resistance to early blight (Alternaria solani). Resistance was identified and the selected plants were grown in a replicated trial in 1981 for more critical evaluation. In addition, a study was initiated to estimate heritability of the resistance. Thirty crosses of 60 segregates each (1800 plants) were inoculated and evaluated for disease reaction. Preliminary data and analysis indicate high heritability coefficient estimates. From both the parental clone planting and the seedling families, high levels of resistance were identified.

4X - 2X Crosses. The program of hybridization between commercial tetraploids and selected diploids was greatly expanded. Hybrids were made between tetraploids and heat tolerant, high specific gravity, and early blight resistant diploid clones. These will be evaluated in 1982. A small number of 4X - 2X progenies from 1980 crosses are being field tested in an eastern performance trial in 1982.

North Carolina Table 1. Potato performance trial in Tyrrell County. Plots were 1 row, 24 ft. long, 4 replications of 32 entries in RCB, 32 hills/plot. Spacing in row, 9 inches. Width row, 40 inches. Fertilized: 1000 lbs./A. 15-10-10 banded. Planted 3/4/81, harvested 6/26/81 (112 days).

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip[1/] Color	Appear[2/] ance	Maturity
Pungo	319	91.3	1.076	4.0	7.2	Midseason
73C26-5	316	93.7	58	7.0	6.7	Med. late
Belchip	310	91.8	66	3.5	7.2	Midseason
73C26-4	310	97.3	50	6.0	8.0	Med. late
B8706-7	309	95.7	66	5.0	8.0	Med. early
B9336-N3	308	89.8	67	5.5	8.5	Med. early
B9130-24	301	88.1	67	5.5	8.0	Midseason
B9455-N9	296	92.4	62	5.5	7.7	Midseason
Superior	293	95.8	66	4.0	8.0	Med. early
Norchip	281	90.8	68	5.0	8.0	Med. early
Atlantic	280	91.3	71	5.0	8.0	Midseason
B9336-N10	279	92.2	63	5.5	7.7	Med. early
72C75-3	279	84.0	81	5.5	7.7	Midseason
B9455-N18	277	89.2	69	5.5	8.0	Med. early
76C11-3	275	92.8	66	6.0	9.0	Early
B9336-N2	274	90.6	64	6.5	8.0	Midseason
Croatan	272	90.8	55	5.0	8.0	Med. early
73C28-4	268	86.2	53	6.0	7.7	Med. early
B9628-N3	264	88.4	57	3.5	8.2	Med. early
71C15-20	256	90.3	71	4.5	8.0	Midseason
73C26-1	253	91.4	50	5.5	9.0	Med. early
76C29-4	242	92.1	-	5.0	8.0	Med. early
B9336-N11	240	92.6	69	3.0	8.7	Med. early
B9455-N16	239	92.2	69	4.5	8.0	Med. early
72C75-2	238	76.1	66	5.0	8.0	Midseason
B8972-1	233	85.4	62	2.5	9.0	Early
B8686-8	231	82.0	77	4.5	7.0	Midseason
B8934-4	189	76.9	60	3.0	8.5	Med. early
B8833-6	182	83.3	71	5.5	8.0	Med. early
Belrus	154	79.7	67	2.5	9.0	Early
76C10-3	144	71.6	70	5.5	8.0	Midseason
B9455-N4	116	75.8	80	2.5	8.0	Early
L.S.D. (.05)	55	5.5			.4	
C.V. (PCT)	15.1	4.5			3.7	

[1/] Chip color determined by Wise Foods, Borden, Inc., Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1 = perfect; 5 useable but not desirable; 6-14 unacceptable with 14 = black.

[2/] Appearance
1 = Very poor 7 = Good
3 = Poor 9 = Excellent
5 = Fair

North Carolina Table 2. Potato performance trial at Weeksville. Plots were 1 row, 24 ft. long, 4 replications of 24 entries in RCB, 32 hills/plot. Spacing in row, 9 inches. Width row, 40 inches. Fertilized: 1600 lb.A. 10-10-15. Planted 3/10/81, harvested 6/25/81 (106 days).

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip[1/] Color	Appear[2/] ance	Maturity
Pungo	361	92.7	1.077	4.5	7.5	Midseason
Belchip	351	95.6	66	3.0	7.5	Midseason
Atlantic	348	93.6	77	4.0	7.7	Midseason
Croatan	328	94.5	57	3.5	7.5	Midseason
72C75-2	327	87.6	56	4.5	7.0	Midseason
75C2-5	326	91.1	54	5.0	7.5	Midseason
72C75-3	321	89.6	66	4.0	7.7	Midseason
75C5-4	316	91.3	61	5.0	8.7	Med. early
76C2-2	306	90.6	67	6.5	8.0	Midseason
Superior	302	96.0	60	5.0	8.7	Med. early
B9455-N9	284	89.7	68	6.0	8.2	Med. early
73C26-5	277	94.0	45	6.5	7.0	Med. late
Norchip	276	90.1	67	4.5	7.5	Med. early
B9455-N16	272	91.0	73	5.5	7.2	Midseason
76C1-1	165	93.0	67	6.5	8.2	Med. early
B9455-N18	263	92.2	65	5.0	7.7	Midseason
73C26-4	260	96.5	62	5.5	7.2	Med. late
B9336-N11	259	90.6	72	3.5	8.5	Med. early
73C26-1	249	92.7	68	5.0	8.7	Med. early
76C4-2	223	80.2	64	5.0	8.7	Med. early
B8686-8	195	82.7	71	6.0	7.0	Midseason
71C15-20	187	88.8	79	4.0	8.0	Midseason
B8934-4	184	82.2	62	3.0	8.2	Med. early
Belrus	118	81.4	71	4.0	8.0	Med. early
L.S.D. (.05)	39	3.6			.6	
C.V. (PCT)	10.0	2.8			5.8	

1/ and 2/ See footnotes, N. C. Table 1.

North Carolina Table 3. Potato performance trial at Tidewater Research Station, Plymouth. Breeding clone trial. Plots were 1 row, 30 ft. long, 36 replicated entries, 48 augmented entries (12 per rep), 4 replications in RCB W/aug. ent. design. 36 hills per plot. Spacing in row, 10 inches. Width row, 38 inches. Fertilized: Total/A. 100 lbs. N, 200 lbs. P_2O_5, 200 lbs. K_2O banded. 30 lbs./A. N. applied midseason. Planted 3/9/81, harvested 6/30/81 (112 days).

Variety	Total cwt/A	Percent US#1-A	Appear[2/] ance	Maturity
		Replicated entries		
72C75-3	280	76.4	7.2	Midseason
73C28-4	229	82.7	7.0	Midseason
73C26-1	227	90.0	7.7	Med. early
Pungo	226	86.4	7.2	Midseason
Atlantic	222	86.1	8.0	Midseason
Belchip	212	88.1	7.0	Midseason
76C33-1	209	83.1	7.7	Med. early
B9484-N1	206	82.7	7.2	Midseason
Norchip	201	86.4	7.0	Med. early
Croatan	196	78.8	7.2	Midseason
Superior	186	88.6	8.0	Med. early
73C26-4	180	91.7	6.7	Midseason
B9648-N1	179	89.7	8.0	Midseason
77C15-2	179	85.1	7.2	Midseason
B9336-N11	177	86.1	7.0	Med. early
B6987-184	175	77.8	8.0	Med. early
73C26-5	169	86.5	6.5	Med. late
CS2175	164	66.1	7.5	Med. early
B8755-N7	157	70.2	8.0	Med. early
CS2115	154	77.9	7.5	Midseason
76C33-4	151	79.5	8.5	Early
CS2106	149	87.2	9.0	Med. early
72C75-2	147	55.9	7.2	Midseason
CS2114	144	78.6	8.2	Med. early
76C4-5	141	77.3	6.2	Midseason
B9655-N1	137	71.5	7.5	Midseason
B8706-N2	132	60.6	7.0	Midseason
Belrus	129	67.2	8.0	Early
CS2189	119	78.8	8.0	Early
71C4-5	117	86.1	7.2	Midseason
CS2118	113	86.3	8.0	Med. early
76C42-1	110	67.9	8.2	Med. early
71C15-20	102	80.5	8.0	Midseason
B9628-N2	102	77.9	7.2	Med. early
CS2095	95	69.1	8.7	Med. early
CS2176	65	69.2	8.0	Midseason

North Carolina Table 3 continued.

Augmented entries - Rep I - adjusted yields

R. Pontiac	274	96.2	7.0	Midseason
CS2190	236	90.4	9.0	Early
77C15-1	231	77.3	8.0	Midseason
CS2066	223	88.9	8.0	Midseason
76C18-6	197	69.1	7.0	Midseason
CS2197	194	93.3	8.0	Midseason
76C29-4	178	65.0	7.0	Midseason
76C18-1	155	74.7	8.0	Early
B9616-N2	153	80.3	8.0	Med. early
B9627-N1	148	77.4	8.0	Med. early
76C13-6	147	92.7	8.0	Midseason
76C29-2	146	60.3	7.0	Midseason

Augmented entries - Rep II - adjusted yields

76C29-4	246	93.9	7.0	Midseason
76C18-4	245	92.4	8.0	Med. early
76C18-5	232	82.8	7.0	Midseason
CS1978	200	89.0	8.0	Midseason
76C33-2	185	93.8	7.0	Midseason
77C25-1	170	84.9	6.0	Midseason
76C21-2	163	82.6	7.0	Midseason
B9336-N2	149	86.2	7.0	Med. early
B9622-N5	144	33.4	9.0	Early
77C14-1	136	90.9	7.0	Med. late
77C8-1	129	72.4	6.0	Midseason
B9336-N14	122	78.9	7.0	Midseason

Augmented entries - Rep III - adjusted yields

76C29-1	190	89.4	8.0	Early
B9627-N2	173	87.7	8.0	Early
76C29-7	171	86.4	7.0	Early
76C28-2	165	85.3	8.0	Med. early
77C3-2	152	81.5	8.0	Med. early
CS1979	150	82.2	9.0	Early
Superior-L	101	82.2	7.0	Midseason
77C4-2	96	89.0	7.0	Midseason
76C25-2	95	86.1	7.0	Med. late
76C29-5	70	90.2	8.0	Med. early
76C29-10	68	61.0	8.0	Med. early
B9624-N1	66	67.6	8.0	Midseason

North Carolina Table 3 continued.

Augmented entries - Rep IV - adjusted yields

B8737-N5	209	92.3	6.0	Midseason
B9455-N9	179	85.4	8.0	Early
CS2191	174	91.6	8.0	Midseason
B9631-N2	162	84.8	7.0	Midseason
B9455-N16	153	85.2	7.0	Midseason
76C29-9	141	77.1	7.0	Med. late
76C29-8	139	82.8	8.0	Midseason
77C14-2	120	86.0	7.0	Midseason
B9622-N4	118	82.0	8.0	Med. early
CS1854	88	64.3	9.0	Early
76C11-2	70	64.6	7.0	Med. early
B9644-N1	48	72.8	9.0	Med. early
L.S.D. (.05)				
RE	33	7.5		
AE Same Rep.	67	15.1		
AE Dif. Rep.	68	15.3		
RE vs. RE	54	12.1		
C.V. (PCT)	14.7	6.8		

2/See foctnotes, N.C. Table 1.

NORTH DAKOTA

R. H. Johansen, B. Farnsworth, D. Hahn, G. Secor and P. Nolte

Potato Breeding Program

Crosses and Seedling Production. From February through April, 333 crosses were made in the greenhouse during 1981. Crosses were made for good red skin color, russeting, disease resistance, yield, processing qualities, high solids and good horticultural characteristics. Potato crosses adapted for California potato production were also made. Breeding objectives for the California program are earliness, russeting, long and smooth type and cultivars adapted to the hot interior valley of California. During 1981 56,402 seedlings were grown in the greenhouse and will be planted at the Langdon, North Dakota Experiment Station in 1982.

A total of 50,193 seedling tubers were planted at the Langdon Experiment Station in 1981. Of these seedlings, 12.2 percent were reds, 61.6 percent were whites and 26.2 percent were russets. The seedling plot was planted on May 12th and 13th and harvested on September 14-16th. Approximately 1,200 seedlings were saved at harvest for further study and evaluation.

Advanced Selections. In 1981, 916 second year selections and 58 second year selections from Minnesota and Texas were planted in an adaptation trial at Grand Forks and a seed increase plot at Absaraka. In addition, 247 third year selections, 116 fourth year selections, 97 selections and cultivars from other breeding programs and 106 Texas selections were planted in adaptation trials at Grand Forks and a seed increase plot at Casselton. Several second year and some older selections were sent to Beach, North Dakota and planted in a seed increase plot. The plots at Grand Forks were planted on May 15th and harvested on September 1-2. Casselton was planted on May 7th and harvested on September 3, 4, 8, 9 and 10. An increase plot of several promising advanced selections was also planted on the Ralph Mathew farm at Barnesville, Minnesota. This plot was planted on May 29 and harvested October 2. The plot at Barnesville was planted on sandy soils.

Promising Selections and Cultivars. The most promising advanced selection in the North Dakota program appears to be ND146-4R. This selection has been ranked third and first in overall merit ratings when tested in the North Central Trial during 1979 and 1980. Compared to Norland, ND146-4R is as early but has higher yield and percent solids; ND146-4R has good culinary and chipping qualities. In 1981, approximately 80 acres of certified seed of ND146-4R were grown by growers at Beach, Cando and in the Red River Valley.

Other selections showing promise are ND388-1Russ, ND534-4Russ, ND55-7, ND294-1R and ND372-2R. Approximately one acre each of ND388-1Russ and ND534-4Russ were planted for seed increase at Beach in 1981.

Crystal and Lemhi, two cultivars released two years ago, are also being increased and tested. There seems to be some interest in California for

Crystal as a processing cultivar. Lemhi has been reported to show serious hollow heart when grown in the Red River Valley and black spot when grown in California. At the present, the future of both of these cultivars is unknown.

Cultivar Trials. Trials consisting of 25 hills grown in four replicated blocks were planted at Grand Forks, Park River, Minot and Williston. Wayne Grinde, County Extension Agent, was in charbe of the Park River Trial and Dennis Askim, Farm Manager of the Research Farm, was in charge of the Grand Forks trial. Superintendents Ernie French and Ben Hoag were in charge of the Williston and Minot trial, respectively (North Dakota Table 1). In the Park River trial, 25 entries were tested while 16 entries were tested at Minot and Williston. Marketable yield consisted of all U.S. No.1 tubers over 1-7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

In addition to the State trials, eight russet, four red and four white selections were planted in a trial at Grand Forks. Also at Grand Forks, an Ethanol trial was planted in cooperation with Dr. Mark Martin; Prosser, Washington and will be summarized in another report. The North Central Trial was planted at Grand Forks and its data will also be summarized in another report.

Spacing, fertilizer, soil type, planting and harvest dates of the 1981 trial are as follows:

North Dakota Table 1. Spacing, fertilizer, soil type, planting and harvest dates of the 1981 trial.

Location	Spacing Row (in.)	Spacing Plant (in.)	Fertilizer	Soil Type 1/	Planting Date	Harvest Date
Park River	38	12	Fall application	Bearden SL	4/29	9/1
Grand Forks	38	12	340#/20-20-20	Bearden CL	5/13	9/21
Minot	36	14	None reported	Williams L	5/15	9/15
Williston	36	16	96-69-0	Williams L	5/5	10/2

1/ L - Loam
SL - Silt Loam
CL - Clay Loam

In general, environmental conditions in 1981 were quite favorable for potato production in the Red River Valley. The only exception was at Park River, where a dry period occurred at a critical time for good potato production. This was the first time in several years that the Park River trial produced lower yield than the Grand Forks trials. Grand Forks received almost 10 inches of precipitation during the growing season. It was extremely dry and hot in western North Dakota during most of the season. Spring again came early with the trial at Park River being planted on April 29th.

In the Red River Valley trials the average yield for all entries was 233 cwt/A at Grand Forks and 138 cwt/A at Park River (North Dakota Table 2). Yields at Williston averaged 65 cwt/A and at Minot 91 cwt/A. All yields are reported as U.S. No. 1 yields.

Crystal, with an average U.S. No. 1 yield per acre of 261 cwt was the highest yielding entry in the trials in the Red River Valley or eastern North Dakota. Other high yielding entries were ND258-1, Red Pontiac, Kennebec and Lemhi. In the Red River Valley trials, ND146-4R had an average yield of 211 cwt/A compared to Norland with 148 cwt/acre. Entries that produced the lowest yields were TND14-1Russ, ND115-21R and ND632-5; ND55-7 produced yields slightly higher than Norchip.

In the trials in western North Dakota, Red Pontiac, Viking, Crystal, Kennebec and ND9403-16R produced the highest yields (North Dakota Table 3). All five of these cultivars and selections have some drought resistance and it is not surprising that with the droughty conditions in western North Dakota that these entries did better than the early maturing cultivars and selections that are not drought resistant.

Entries Lemhi, ND55-7, Norchip, Crystal and ND258-1 produced the highest average total solids when tested at Grand Forks and Park River. These five cultivars and selections averaged above 21.7 percent total solids. In similar trials, ND146-4R produced total solids averaging 20.1 percent compared to Norland with 18.6 percent, Bison 19.6 percent and Red Pontiac with 18.9 percent. At Minot and Williston, ND55-7 produced the highest percent total solids.

Processing Tests - Chipping. During 1981-1982, 176 second year, 65 third year and 76 fourth year and older selections will be tested for chip quality by the Potato Research Lab at East Grand Forks, Minnesota. Percent sucrose will be determined on the second year selections.

During 1980, 134 second year selections were tested for chip quality by the Research Laboratory. Of these selections, 12 percent had Agtron readings ranging from 40-45 and 14 percent had Agtron readings ranging from 46 to 52. The second year selections were chipped only once after being stored at 43° F for about three months and then reconditioned for one month at 65° F. The third year selections were chipped twice; once out of 43° F storage and again out of 65° F after being stored for one month. When chipped out of 65° F storage, 26 percent of the third year selections had Agtron readings ranging from 40-45 and seven percent had Agtron readings from 32 to 40.

Chip tests were again conducted on the 1980 potato cultivar trials grown at Park River and Grand Forks, North Dakota (Table 4). The samples were chipped out of 40° F storage and then chipped two weeks and four weeks out of 65° F storage. The best selections for chipping in both trials were ND8850-2, ND193-2, ND55-7 and the best cultivars were Dakchip and Norchip. Crystal chipped comparable to Kennebec but was darker than both Norchip and Dakchip.

Processing Tests - Frozen French Fry and Flake Tests. The Potato Research Laboratory at East Grand Forks, Minnesota prepared frozen french fry and flake products from some of the most promising North Dakota selections and cultivars. The highest sensory scores for french fry color, texture and flavor were produced by ND119-3 and ND467-3. In similar tests, Crystal and ND388-1Russ had much better color, flavor and texture than Russet Burbank. Flake sensory tests indicated that several advanced selections were better than Norchip. Sensory tests for french fries and flakes are found in North Dakota Table 5.

Culinary Tests. Several advanced selections and cultivars grown in the 1980 potato cultivar trials at Park River and Grand Forks were tested for boiling and baking qualities. Sloughing was again observed in the selections and cultivars with high total solids. Some after cooking darkening was observed in ND146-4R (North Dakota Table 6).

Other Trials. A trial of several new advanced selections were planted in a trial at Grand Forks. These selections were ones that have shown promise in a very early stage of development; however they have had only limited testing for yield or specific gravity. The highest yielding russet selections were ND722-2Russ and ND748-3Russ. In the red and white group, ND678-8, ND651-9 and ND731-6R produced the highest yield (North Dakota Table 7).

Disease Control and Resistance. Approximately 916 second year, 247 third year and 116 fourth year selections were evaluated for scab and silver scurf resistance at the Potato Research Farm, Grand Forks. Many selections appeared to have excellent resistance to scab and silver scurf. Over 50 percent of the selections showed some resistance to both of these diseases.

Approximately 916 second year selections were grown in a potato-free area (Absaraka) and evaluated for disease and horticultural characters. Diseased selections were removed and superior selections saved for further observation and indexing.

Approximately 400 advanced selections were greenhouse grown and read visually for tuber borne diseases. These selections were also indexed for spindle tuber using gel electrophoresis and PVX using serology. None were found to be infected with PVX and only a few were found to be infected with PSTV. The disease-free selections were maintained at the Agronomy Seed Farm, Casselton, as a source of clean seed for breeding and other purposes.

Approximately 30 selections were indexed for disease and released to growers in Beach, North Dakota for increase as part of the basic seed stock program.

Representative tubers of second year and advanced selections were grown in Florida for winter indexing of virus diseases (cooperator, Doug Johansen, State Seed Department).

Resistance to late blight (race 0) was evaluated for 40 advanced selections. In 17 of these selections, resistance was evaluated in both foliar and tuber tissue. In four selections, ND146-4R, ND372-2R, ND413-4 and ND 651-5, resistance was found to late blight in both foliar and tuber tissue. In

four other selections, ND55-7, ND698-1, ND741-7 and ND9403-16R, resistance was exhibited in tuber tissue however only moderate resistance was found in foliar tissue.

In an additional 23 selections, resistance to late blight was evaluated only in foliar tissues. Of the selections evaluated only one, ND1069-2Russ, was resistant and seven selections, ND1062-3Russ, ND664-12R, ND967-1Russ, ND744-1R, ND860-2, ND821-3R and ND1000-5R were moderately resistant.

One of the most outstanding advanced selections, ND146-4R, has good late blight resistance in both tuber and foliar tissue and, based on widespread field data, appears to have excellent resistance to scab and silver scurf. This selection is susceptible to Verticillium and Fusarium dry rot.

North Dakota Table 2. U.S. No. 1 Yield, Percent U.S. No. 1 and Total Solids of Potato Cultivars Grown in the Red River Valley Trials, 1981

Cultivar	Grand Forks			Park River			Average		
	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids
Crystal	313	94	21.8	208	85	21.6	261	90	21.7
ND258-1	288	95	22.4	221	89	20.9	255	92	21.7
Red Pontiac	291	97	19.0	200	91	18.8	246	94	18.9
Kennebec	290	97	20.3	202	93	20.7	246	95	20.5
Lemhi	262	90	22.2	198	87	22.2	230	89	22.2
ND294-1R	253	97	21.4	185	93	19.7	219	90	20.6
ND445-1	292	98	19.2	140	82	18.8	216	90	19.0
ND372-2R	246	98	21.8	178	80	21.2	212	89	21.5
ND146-4R	260	94	20.1	162	81	20.1	211	88	20.1
ND9403-16R	248	94	20.1	164	85	19.7	206	90	19.9
ND55-7	252	99	22.0	132	69	21.6	192	84	21.8
ND463-1R	238	96	20.5	138	85	20.7	188	91	20.6
Norgold Russet	241	91	20.1	124	78	20.9	183	85	20.5
ND388-1Russ	223	93	20.3	124	75	21.4	173	84	20.9
Norchip	224	92	22.2	115	67	21.4	170	80	21.8
ND534-4Russ	210	89	20.3	124	76	21.4	167	83	20.9
Russet Burbank	204	89	20.5	110	71	20.9	157	80	20.7
Bison	207	92	19.7	101	78	19.4	154	85	19.6
ND206-1R	183	96	20.1	124	82	19.0	154	89	19.5
ND467-3	191	86	19.4	107	61	18.6	149	74	19.0
Norland	174	92	18.8	121	77	18.4	148	85	18.6
ND612-9	188	92	21.2	88	53	20.9	138	73	21.1
TND14-1Russ	193	89	22.2	55	54	20.7	124	72	21.5
ND115-21R	175	91	18.6	70	66	18.6	123	79	18.6
ND632-5	183	88	21.8	63	58	20.9	123	73	21.4
Average	233	93	20.6	138	76	19.6	186	85	20.5

North Dakota Table 3. U.S. No. 1 Yield, Percent U.S. No. 1 and Total Solids of Potato Cultivars and Selections Grown in Western North Dakota Trials.

	Minot			Williston			Average		
Cultivar	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids	Cwt/A U.S. No. 1 Yield	% U.S. No. 1	Total Solids
Red Pontiac	144	84	20.5	77	89	21.2	111	87	20.9
Viking	127	97	22.1	87	93	22.7	107	95	22.4
Crystal	117	80	23.3	86	76	22.2	102	78	22.8
Kennebec	139	88	22.9	64	84	22.9	102	86	22.9
ND9403-16R	124	89	21.4	77	83	22.7	101	86	22.1
Lemhi	132	86	22.9	47	70	22.7	101	86	22.1
ND372-2R	94	74	22.7	70	85	22.4	85	80	22.6
ND294-1R	93	73	21.2	74	80	20.7	84	77	21.0
ND146-4R	77	70	21.2	71	73	22.0	74	72	21.6
Norland	67	69	19.4	72	86	20.5	70	78	20.0
Bison	79	77	21.4	51	65	21.8	65	71	21.6
ND55-7	54	47	23.1	64	66	22.9	59	57	23.0
Russet Burbank	59	53	22.2	56	64	22.7	58	59	22.5
Norgold Russet	66	67	21.8	48	67	22.0	57	67	21.9
Norchip	50	52	23.1	55	71	22.9	53	62	23.0
TND 14-1Russ	41	59	22.0	34	60	22.7	38	60	22.4
Average	91	73	22.0	65	76	22.2	79	75	22.1

North Dakota Table 4. 1981 Chip Tests of Cultivars and Selections Grown at Grand Forks and Park River-1980.

Cultivar	Agtron 0 weeks 38°F		Agtron 2 weeks 68°F		Agtron 4 weeks 68°F		Percent yield average 3 tests	
	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River
Bison	11.3	13.5	24.5	27.5	28.0	44.8	30.3	29.8
Crystal	12.5	17.8	23.5	28.0	31.0	39.5	31.7	33.3
Dakchip	16.5	27.5	21.5	42.5	32.0	50.0	32.4	34.3
Kennebec	10.5	15.0	24.8	35.8	25.3	42.8	30.2	30.5
Lemhi	13.3	18.0	19.5	30.5	33.0	38.5	30.4	33.3
Norchip	12.0	26.0	28.3	35.5	42.5	49.8	32.6	33.7
Norgold Russet	10.3	18.3	24.3	25.5	22.8	36.5	30.5	32.4
Red Norland	13.5	15.0	25.0	30.5	39.5	49.0	29.8	30.3
Red Pontiac	8.5	19.5	21.0	22.0	17.0	28.5	29.1	31.1
Russet Burbank	11.3	19.5	18.5	21.5	22.0	33.3	30.6	32.3
Viking	6.0	11.3	18.3	14.0	12.5	18.5	29.3	30.3
AND 7422-1Russ	11.0	17.3	17.5	24.0	21.8	38.5	31.1	32.8
TND 14-1Russ	12.5	14.5	19.0	18.0	23.0	32.8	31.4	30.4
ND55-7	16.5	19.0	22.3	30.5	40.5	48.0	31.6	33.3
ND119-3	13.0	26.8	22.5	36.0	34.8	48.3	30.8	33.0
ND146-4R	10.5	23.5	30.5	37.5	30.5	50.3	31.4	31.6
ND193-2	13.0	21.0	24.5	44.5	47.5	58.0	30.8	32.5
ND206-1R	7.8	9.8	21.5	23.5	24.5	27.5	30.4	31.1
ND258-1	12.8	16.5	28.0	26.0	38.5	41.3	31.8	31.1
ND294-1R	8.0	11.0	22.0	22.5	23.0	32.0	29.9	29.4
ND372-2R	11.8	13.3	24.0	26.3	33.5	29.8	32.7	32.3
ND383-9	12.5	13.8	32.5	35.3	35.5	49.5	35.0	33.7
ND463-1R	12.5	16.5	20.8	20.3	28.8	41.8	29.6	30.8
ND467-3	12.5	15.0	26.0	21.5	32.5	34.0	29.8	30.0
ND8850-2	25.5	29.5	21.5	42.5	34.8	51.0	31.3	32.5

North Dakota Table 5. French Fry and Flake Tests of Potato Cultivars and Selections Grown in 1980 Trials[1/].

Cultivar	Color[2/]	Texture	Flavor	Average for all tests
		FRENCH FRIES		
ND119-3	7.88	7.30	7.75	7.64
ND467-3	7.50	7.33	6.84	7.22
ND728-13Russ	7.70	7.05	6.76	7.17
Crystal	7.46	6.96	6.67	7.03
ND388-1Russ	7.27	7.52	6.00	6.93
ND612-9	6.39	7.02	7.35	6.92
TND 14-1Russ	6.93	6.78	6.83	6.85
ND651-5	7.46	7.38	5.59	6.81
ND457-17	6.46	7.07	6.32	6.62
ND445-1	6.77	6.54	6.45	6.59
ND671-2Russ	6.20	6.32	6.67	6.40
Russet Burbank	5.92	6.34	5.75	6.00
ND537-8Russ	5.80	5.47	6.09	5.79
ND722-2Russ	4.94	6.14	5.62	5.57
ND790-4Russ	4.71	5.67	5.29	5.22
ND455-1Russ	4.93	5.70	4.40	5.01
ND606-4Russ	4.42	5.32	4.67	4.80
AND 7430-1Russ	4.94	4.83	3.73	4.50
Viking	3.75	5.10	4.30	4.38
ND469-7Russ	3.00	5.50	3.42	3.97
ND748-3Russ	3.57	4.54	3.22	3.78
AVERAGE	5.90	6.28	5.70	5.96
		POTATO FLAKES		
Dakchip	8.33	8.17	7.83	8.11
ND8850-2	8.20	7.60	7.40	7.73
Russet Burbank	8.00	7.50	7.17	7.56
ND55-7	8.00	7.83	6.67	7.50
ND467-3	7.40	7.60	7.20	7.40
ND119-3	7.83	7.00	7.33	7.39
Norchip	8.00	6.83	6.67	7.17
ND445-1	8.00	6.83	6.83	7.22
Crystal	7.67	6.33	7.00	7.00
TND 14-1Russ	7.60	7.00	6.00	6.87
ND455-1Russ	6.50	6.67	6.17	6.45
ND388-1Russ	6.50	4.17	3.00	4.56
AVERAGE	7.67	6.96	6.61	7.08

1/ RATING GUIDE: 7-9 (Good); 5-6 (Fair, but acceptable); 104 (Poor, not acceptable)

2/ Not treated for color correction on french fry score.

North Dakota Table 6. 1981 Cooking Tests of Cultivars and Selections Grown and Grand Forks and Park River, North Dakota - 1980[1/].

	Boiling					Baking		
Cultivar	Sloughing[2/]	Mealiness[3/]	Color After Cooking[4/]	Color 4 Hours After Cooking[5/]	Flavor[6/]	Mealiness	Color	Flavor
Bison	10.0	4.3	9.0	7.3	7.3	4.9	9.5	6.7
Crystal	8.0	8.5	10.0	9.0	8.3	6.8	9.5	7.3
Dakchip	9.9	6.9	9.5	6.5	8.0	5.9	10.0	7.2
Kennebec	9.4	7.8	7.5	8.0	6.7	6.8	8.8	6.8
Lemhi	8.5	6.3	7.5	8.2	7.0	7.2	9.3	6.4
Norchip	9.1	8.2	8.0	7.3	8.4	7.3	9.8	7.1
Norgold Russet	8.5	8.3	9.0	2.5	8.1	7.6	10.0	7.7
Red Norland	9.9	5.7	9.3	8.3	7.8	5.4	9.8	6.8
Red Pontiac	9.5	6.7	9.5	8.8	7.8	5.8	9.3	7.1
Russet Burbank	10.0	7.4	9.0	8.8	6.5	8.1	9.3	6.2
Viking	10.0	5.4	10.0	9.0	7.1	5.4	9.5	6.6
AND7422-1Russ	9.4	7.9	8.3	8.8	7.4	6.8	9.0	6.7
TND 14-1Russ	8.4	6.9	9.3	9.3	7.8	7.4	9.3	6.9
ND 55-7	6.6	8.7	8.8	9.0	7.9	6.9	9.8	8.2
ND 119-3	9.6	6.2	9.0	7.5	6.8	7.7	10.0	7.4
ND 146-4R	9.5	5.9	7.5	5.5	7.7	6.0	9.5	7.2
ND 193-2	9.1	5.1	9.0	7.3	7.3	5.4	9.3	6.7
ND 206-1R	9.5	6.3	7.8	8.8	7.8	6.2	9.0	5.9
ND 258-1	8.9	7.4	8.8	7.8	6.8	7.5	9.3	7.2
ND 294-1R	9.3	4.9	7.5	7.5	6.8	6.4	9.8	6.9
ND 372-2R	8.5	7.1	8.5	8.4	7.8	7.4	10.0	7.3
ND 383-9	8.1	9.1	8.5	8.0	7.4	7.3	9.3	6.1
ND 463-1R	9.7	5.3	9.0	7.3	6.7	5.3	9.0	6.8
ND 467-3	10.0	4.4	9.3	7.0	7.7	5.3	9.8	6.8
ND 8850-2	9.4	7.3	9.5	7.5	7.5	6.2	9.3	7.4

1/ Average of two locations (Grand Forks and Park River).
2/ Severe Sloughing - 1; No Sloughing - 10
3/ Not Mealy - 1; Very Dry and Mealy - 10
4/ Dark - 1; Very White - 10
5/ Dark - 1; Very White - 10
6/ Poor Flavor - 1; Excellent Flavor - 10

North Dakota Table 7. Russet, Red and White-Skinned Selections Grown at Grand Forks, North Dakota - 1981.

Cultivar	Total Yield (Cwt/A)	No.1 Yield (Cwt/A)	Specific Gravity[1/]	% Total Solids
Russets				
ND450-11Russ	186	163	90	21.8
ND455-1Russ	153	86	72	18.0
ND537-8Russ	213	164	93	22.4
ND606-4Russ	213	153	88	21.4
ND722-2Russ	238	161	70	17.5
ND748-3Russ	236	190	85	20.7
ND765-1Russ	188	143	94	22.7
ND770-4Russ	195	162	93	22.4
Reds and Whites				
ND649-4R	233	207	87	21.2
ND651-9	293	248	89	21.6
ND664-12R	244	171	78	19.2
ND678-8	257	229	89	21.6
ND689-3	240	207	92	22.2
ND731-6R	247	217	88	21.4
ND744-1R	239	210	80	19.7
ND779-4	214	179	89	21.6
Average	224	181	86	20.9

1/ 1.0 deleted.

[OHIO]

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Potato Cultivar Trials, 1981

Over 60 potato varieties and advanced selections were evaluated in trials across Ohio in 1981. These trials included: 1) a Statewide Trial of 10 entries located on 6 commercial farms, 2) an Observation Trial of many newer entries located on two of the 6 commercial farms, and 3) a trial of 8 entries at the OARDC Muck Crops Branch at Celeryville.

Ten entries were evaluated at 6 commercial farms located across the state. Eight of the entries (Crystal, Neb. A129.69-1, W 718, Denali, NY 59, Jemseg, Dakchip, and Michimac) were included because they have looked promising in previous years, and the other two entries (Norchip and Katahdin) were included as standards. Katahdin was included for comparison as a standard midseason variety, and Norchip was included as a standard for comparison of chipping potential. Twenty-three entries were evaluated in the observation plots.

All plots on the 6 commercial farms were subjected to standard cultural and pest control practices used on those farms. Plots consisted of double rows approximately 40 feet long (80 seedpieces) and entries were replicated four times. Stand, vigor, and disease were evaluated at certain farms during the growing season. The observation plots on two of the six farms that had the main plots. Plot size consisted of double rows approximately 25 feet long (50 seedpieces).

Neb. A129.69-1 led in yield in the Statewide Trials the second year in a row. Tubers have a very low percentage of internal defects. Tubers are attractive. It remains a promising late-maturing fresh market cultivar. NY 59 continues to produce high yields but the high percentage in internal necrosis in certain years will probably limit its use in Ohio. W 718 continues to have above-average yields. The tendency to hollow heart in this cultivar should be taken into account if planted commercially. It continues to be a promising fresh market cultivar. Denali over several years has shown a high yield potential and has high specific gravity. It is a promising late maturing chipping cultivar. Jemseg shows promise as an early maturity fresh market cultivar for Ohio but needs further testing.

The four highest yielding cultivars, in the observation trial, were BR 5991-WV16, AK 114, Russette, and Atlantic. AK 114 and BR 5991-WV16 look promising in limited tests in Ohio and will be tested again next year. Russette has heavily russetted oval to oblong tubers and above-average yields. It has shown a tendency to hollow heart. Atlantic continues to have high yields but because of the severe internal necrosis problems in certain years it cannot be recommended. It also has a hollow-heart problem.

W 718, Michimac, Jemseg, and Katahdin produced equivalent yields of U.S. No. 1 potatoes in the muck trial. W 718 led in yield for the sixth consecutive year. Jemseg had the most hollow heart of any cultivar on the muck. W 718 has shown a tendency to hollow heart in muck soils in previous years. Neb.A129.69-1, which led in yield in the Statewide Trials only had an average yield on muck soil. It had the largest percentage of B-size tubers, but the lowest percentage of culls of the eight cultivars tested. It also showed a tendency to hollow heart on the muck soils.

OHIO Table 1. Average U.S. No. 1 yields, grades, and stands -- Statewide trials, 1981. (Listed in order of average yield of the six farms.)

Entry	Avg. Yield cwt/A	Average Percent			Tuber wt. (oz.)	Avg. percent stand
		U.S. No. 1	B-Size	Culls		
Neb.A129.69-1	336	85.6	5.0	9.2	5.2	94.2
NY 59	324	83.9	4.3	11.9	6.1	89.7
W 718	311	85.5	4.2	10.5	6.1	90.9
Katahdin	292	85.2	3.7	11.1	6.0	88.3
Michimac	273	83.4	5.2	11.6	5.8	89.6
Denali	269	78.6	6.1	15.3	5.6	83.6
Crystal	254	78.2	5.8	15.9	5.6	91.5
Dakchip	240	78.1	5.7	16.1	5.3	89.7
Norchip	231	78.6	10.1	11.3	4.4	90.3
Jemseg	207	80.0	4.0	16.0	6.3	90.0
Average	274	81.7	5.4	12.9	5.7	89.8

OHIO Table 2. Percentage of total tubers cut showing hollow heart and internal necrosis. Statewide Trial.

Entry	H.H.	Nec.	Entry	H.H.	Nec.
Neb. A129.69-1	0.4	1.7	Denali	2.2	3.5
NY 59	2.7	33.0	Crystal	1.2	3.3
W 718	6.4	5.5	Dakchip	0.5	2.0
Katahdin	1.7	7.8	Norchip	0.5	4.0
Michimac	3.2	7.3	Jemseg	6.4	3.0

OHIO Table 3. Yield, grade, and tuber size of Observation Trial entries.

Entry	Yield (cwt/A)	% U.S. No. 1	Tuber weight (oz.)
BR 5991-WV16	398	80	6.1
AK 114	352	84	5.6
Russette	314	90	6.9
Atlantic	314	86	6.3
Kennebec	306	69	6.5
Rosa	300	84	5.8
Neb. 51-3	297	76	6.0
BR 7093-23	287	79	6.3
Chipbelle	282	82	6.4
W 726	280	80	7.3
W 723	271	83	6.2
AK 13-5	269	84	4.5
Bake King	268	88	5.1
MS 402-1	262	80	6.2
Superior	256	86	4.5
AF 205-9	256	80	5.1
W 738	240	68	5.6
AK 14-1	236	73	4.3
Neb. A71.72-1	232	78	6.5
AK 38-2	226	74	6.5
Allegash Russet	186	73	5.0
Highlat Russet	183	74	4.4
TND 14-1 Russet	176	75	5.9

OHIO Table 4. Summary of percent hollow heart and internal necrosis of tubers cut. Observation Trial.

Hollow Heart

Severe	Moderate	Slight
Allegash Russet	Rosa	MS402-1
Atlantic	Highlat Russet	Russette
Neb. A71.72-1		AK 38-2
Chipbelle		

Necrosis

Severe	Moderate	Slight
	BR 5991-WV16	Atlantic
	Neb. A71.72-1	W 738
	Allegash Russet	Kennebec
		W 723
		BR 7093-23

OHIO Table 5. Yield and grade characteristics of entries in Celeryville Muck Trials.

Centry	Cwt/A		Percent				
	Total	US # 1	US #1	B-Size	Culls	H.H.	Nec.
W 718	373	317	85.0	6.9	8.1	13	0
Michimac	348	311	89.3	4.6	6.1	15	0
Jemseg	372	310	83.3	3.6	13.1	40	0
Katahdin	351	308	87.7	3.9	8.4	27	0
Crystal	372	293	78.7	8.1	13.2	0	0
Neb. A129.69-1	332	282	84.9	10.0	5.1	30	0
Superior	313	232	74.1	8.1	17.8	7	0
Dakchip	305	215	70.3	7.8	21.9	0	0

245 OREGON [J.

A. R. Mosley, D. C. Hane, G. E. Carter, M. J. Johnson and C. Stanger

Results of six yield trials conducted in the Columbia Basin and Willamette Valley will be reported herein. Additional varietal information for the Klamath Basin, Malheur County and Central Oregon will be available from the authors by April, 1982.

Crops were grown using cultural practices common to the areas. For the most part, individual plots were single rows 25 feet long, replicated four times. A high percentage of the lines and varieties compared in Oregon in 1981 showed excess tuber-borne mosaic viruses. Therefore, data should not be considered conclusive.

COLUMBIA BASIN TESTS

WESTERN REGIONAL TRIAL. Ten entries were compared at the Columbia Basin Agricultural Research Center (CBARC) at Hermiston. As in most Oregon studies, individual plots were single rows 25 feet long and replicated four times in a randomized block design. Seed pieces were planted nine inches apart in 34-inch rows on April 7. Metribuzin was applied at the rate of ½ lb ai/A on June 4.

None of the entries were outstanding (Table 1), but A 72685-2 did appear to have considerable promise for fresh market. Others showing some promise included WnC 521-12, AD 7377-1, A 72545-2 and Lemhi.

Most of the entries were severely infected with mosaic viruses.

OREGON STATEWIDE TRIAL. The statewide trial was conducted at four locations in 1981, but only Hermiston results will be reported here. The crop was planted and handled as described for the western regional test. Thirty-eight entries were compared.

Large differences in yield and quality were noticeable. Promising selections included: A 69657-4, A 69870-3, A 72602-2, A 74212-1, A 74393-1, A 7596-1, AD 74135-1, Butte and Lemhi. Most of these were oblong to long russets.

ON-FARM TRIALS. Five varieties and two numbered selections were compared under center-pivot irrigation in three commercial fields. Large differences in yield existed among the locations. Average performance for all three locations is summarized in Table 3.

Selection A 74404-3 yielded well but has no potential in the Columbia Basin because of susceptibility to scab. It also showed some tendency toward internal necrosis, although less so than Russet Burbank. Selection AD 7377-1 produced attractive tubers but specific gravities were too low for processing. This entry may have some promise for fresh market.

Nooksack appeared to have considerable potential. Gravities were high and tuber appearance was generally uniform although the shape was rounder and flatter than normally acceptable for processing. Nooksack tubers were large enough to produce a high percentage of long french fries. Russet Burbank was more susceptible to internal necrosis (heat necrosis) than any of the other entries. Internal necrosis is becoming a serious problem in the Columbia Basin.

WILLAMETTE VALLEY TRIAL

Twenty-nine varieties and selections were compared for chipping and fresh market at Corvallis in 1981. U. S. No. 1 yields were lower than normal due to a high percentage of undersize tubers for most varieties. Extremely hot weather during the first two weeks of August was largely responsible for yield deficiencies. However, metribuzin injury obviously caused yield loss for Bison and possibly several others including Belrus and ND 467-3. Seed-borne mosaic viruses also reduced yields for some entries and, therefore, confounded results to some extent. These data should not be considered conclusive, therefore.

Chipping tests are presently being completed and will be available from the authors by April, 1982.

Oregon Table 1. Yield and Quality Characteristics of Western Regional Entries, Hermiston, 1981.

Entry	Yield, Cwt/A		Percent		Oz	Specific	Comments[1/]
	No. 1	Total	No. 1	No. 2	Tuber	Gravity	
A 72545-2	630	697	90	1	11.8	1.078	O.,Lt.Rus. Scab. IN.
A 72685-2	669	743	90	3	11.6	1.082	O.Rus.
AD 7267-1	392	501	78	10	10.6	1.070	O.Rus. Shatter
AD 7377-1	564	669	84	10	10.7	1.075	O.Dk. Rus. G.C. Eyes
AD 74135-1	406	492	82	6	8.7	1.079	O.Rus. Shatter
WnC 521-12	526	564	93	2	8.8	1.096	R,Lt.Rus. Shatter
WnC 672-2	640	716	89	7	8.8	1.083	R,Rus. Scab. Ugly
Lemhi	513	561	91	4	10.9	1.085	O.Rus
Norchip	403	502	80	6	6.6	1.081	R. W. Scab. Cracks
R. Burbank	321	489	66	14	8.6	1.084	L., Rus. Cracks,Knobs
$LSD_{.05}$	133	147	-	-	-	0.005	-

1/ Shape, skin type: O = oblong; R = round; L = long; R = russet; W = white; IN = internal necrosis; GC = growth cracks.

Oregon Table 2. Yield and Quality Characteristics, Statewide Trial, Hermiston, 1981.

Selection	Yield, Cwt/A		Percent		Oz	Specific	Comments[1/]
	No. 1	Total	No. 1	No. 2	Tuber	Gravity	
A 69173-2	407	469	87	3	8.4	1.084	Good O-L,Lt.Rus.6%Mo.
A 69657-4	624	806	77	6	9.8	1.087	White.Scab, G. Poor
A 69870-3	666	709	94	1	8.6	1.082	Good.Blocky rus.
A 69870-6	621	670	93	1	10.0	1.080	R-O,Rus. Late
A 72545-2	655	715	92	2	11.8	1.075	R-O,Lt.rus.60% Mo.
A 72602-2	533	608	88	3	10.6	1.087	Fair Dk. Rus. 30%Mo.
A 7403-3	672	806	83	7	10.9	1.078	Poor,R-O Dk.Rus.18%Mo.
A 7487-3	294	386	76	3	7.2	1.081	Early Lt.Rus. Fair
A 7487-5	357	430	83	3	9.2	1.079	RW, Shatter, Lent. G.
A 74104-8	581	699	83	5	10.7	1.072	O.White, Ugly, 40%Mo.
A 74124-3	635	869	73	12	10.9	1.075	R-O,White,Poor,6%Mo.
A 74212-1	684	768	89	3	9.5	1.078	Good Long Rus. Late
A 74393-1	635	683	93	2	9.1	1.083	Good R-O Rus. Flat.
A 74396-1	138	183	76	6	9.7	1.074	R-O Rus. 90%Mo.
A 74404-3	704	803	88	4	8.5	1.081	R-O Rus. Late. Scab.
A 7518-8	252	311	81	5	7.1	1.078	Small,Rgh. Rus. 79%Mo.
A 7578-5	291	326	89	3	7.7	1.080	R-O Rus. Scab, GC
A 7596-1	744	841	88	7	12.7	1.084	Good Blocky, Dk. Rus.
A 75291-3	481	546	88	4	9.8	1.079	Fair Rus. Flat.
A 75291-4	543	590	92	3	10.9	1.079	Flat. Lt. Rus. 9%Mo.
AC 67560-1	557	610	91	3	10.2	1.074	Red. Scab.
AD 74135-1	518	640	81	7	8.3	1.079	O-L Rus. Fair.
AK 38-2	338	552	61	22	7.6	1.078	Knobs Poor. 27%Mo.
ALR 4-1	446	530	84	1	7.7	1.092	Good Lt. Rus. Scab
Butte	703	767	92	1	7.4	1.086	Fair-Good O. Rus.
Chieftain	586	632	93	3	9.4	1.071	Red. Oblong. 12%Mo.
Lemhi	469	568	83	8	11.3	1.079	Good Blocky Rus. 51%Mo.
ND 137-2	220	322	68	5	5.4	1.068	R.Rus. Dark. Poor. G.C. 18% Mo.
ND 451-2	404	439	92	1	11.2	1.072	R., Blocky Rus. 21%Mo.
ND 561-1	540	619	87	4	11.1	1.078	O.Rus. Late 36%Mo.
ND 638-1	180	211	85	3	6.9	1.073	Cent. Type. 45%Mo.
Norgold	369	417	88	1	8.2	1.077	R-O. Rus. Good 27%Mo.
Pioneer	297	347	85	2	7.7	1.074	Good Oblong Red
R. Burbank	420	576	73	16	8.8	1.086	Long Rus.Knobs. 100% Mo.
R.B.,1978							
Gen. 1	457	754	61	21	9.4	1.083	Long Rus.
T 226-1	421	567	74	6	10.1	1.064	Red. Scab. Rgh.
Targhee	710	810	88	5	9.5	1.084	Dark Rus. Oblong.Ok
WN 630-5	577	670	86	5	13.1	1.081	Long White. Scab.
LSD, .05	147	155	-	-	-	0.005	-

1/ Comments: DK = dark colored; G = green; GCC = growth cracks; L = long; Lt = light colored; Mo = mosaic; O = oblong; R = round; Rgh = rough; Rus = russet; W = white.

Oregon Table 3. Average Yield and Quality of Seven Potato Selections Under Center-Pivot Irrigation on Three Commercial Farms in the Columbia Basin, 1981.

Selection	Yield, Cwt/A No. 1	Yield, Cwt/A Total	Specific Gravity	Oz Tuber	Comments[1/]
A 74404-3	594	712	1.078	8.5	O Rus. Scab! IN
AD 7377-1	520	592	1.076	9.9	R-O, Rus. Sl. Flat.
Butte	417	513	1.084	8.4	O Rus. Small. Sl. Flat. Ok.
Lemhi	376	495	1.087	8.4	O-L Rus. Good.
Nooksack	532	573	1.091	12.7	R-O Rus. Lge. Flat. GC. Skin
R. Burbank	320	481	1.082	8.9	L Rus. Knobs. IN. HH.
Targhee	482	544	1.081	9.3	R-O, Dark Rus. Good

1/ L = long, O = oblong, R = round, IN = internal necrosis, HH = hollow heart, GC= growth cracks.

Oregon Table 4. Yield, Grade and Quality Characteristics of 29 Potato Varieties and Selections, Corvallis, 1981.

Entry	Yield, Cwt/A		Percent[1/]		Specific	Comments
	Total	No. 1	No. 1	<4 oz.	Gravity	
A 74404-3	503	298	59.3	39.6	1.087	Oblong light rus.
AC 67560-1	460	201	43.6	56.0	1.072	Red
AD 7377-1	446	332	74.4	23.0	1.076	Smooth oblong rus.
Allagash	371	209	56.3	41.8	1.075	Fair. Rus.
ALR 22-2	441	205	57.8	35.0	1.079	Round-oblong light rus.
Atlantic	357	233	65.3	32.3	1.087	Smooth. Round rus.
BC 9071-6	513	303	59.2	31.7	1.081	-
Belrus	209	43	20.8	75.9	1.082	Round white. Green.
Bintje	524	253	48.4	48.7	1.083	Large, Green, Yellow
Bison	119	42	35.4	39.3	1.081	Red. Sencor inj.
Butte	354	194	54.7	36.5	1.085	Oblong rus.
Crystal	413	234	56.7	36.0	1.074	Round white
Dakchip	455	266	58.3	34.6	1.072	Round white. Skinning
Delta Gold	570	372	65.2	26.4	1.091	Yellow flesh
Denali	422	271	64.2	19.3	1.094	Round white
Lemhi	434	204	47.0	51.0	1.090	Oblong rus.
ND 55-7	404	177	43.8	54.4	1.073	-
ND 258-1	392	246	62.9	33.3	1.077	-
ND 274-6	286	139	39.2	48.3	1.074	-
ND 467-3	355	90	25.3	66.2	1.068	- Sencor injury.
ND 8850-2	384	165	43.0	54.7	1.073	-
ND 9474-6A	474	300	63.3	28.9	1.070	-
NDD 110-4	401	207	51.7	42.1	1.073	-
Norchip (Neb.)	389	147	37.9	58.8	1.083	Typical
Norchip (N. Rus.)	440	180	40.9	55.9	1.078	Russet norchip?
Norchip (Or.)	451	205	45.4	50.5	1.078	Typical
Norgold	341	163	48.0	43.9	1.076	Some decay
R. Burbank	521	308	59.2	31.4	1.084	Long russet
WC 521-12	290	176	60.6	32.2	1.090	90% virus
$LSD_{.05}$	108	85	-	-	0.004	

1/ Tubers tended to be unusually small in 1981 causing poor grades.

TEXAS

J. Creighton Miller, Jr. and Douglas G. Smallwood

Variety Development and Testing

Seedling Program. Approximately 32,000 first year seedlings, representing 294 families, were grown for selection near Hereford in 1981. However, only 20 selections were made because of severe hail damage sustained by the crop. Approximately one-half (12,264) of the 1981 first year seedlings resulted from crosses made at the Texas Agricultural Experiment Station near Lubbock, during the winter of 1979-1980. The remainder were obtained from Bob Johansen in North Dakota (11,116), Joe Pavek in Idaho (5,187) and Florian Lauer in Minnesota (3,000). The Texas program also supplied the North Dakota, Idaho and Colorado programs with second, third and fourth sized seedling tubers for selection.

Adaptation Trials. Some 568 entries were grown in replicated and non-replicated trials at two locations in West Texas. This provided for testing both on sandy soil with center pivot irrigation (Olton) and on clay or tight soil (Hereford) where the furrow irrigation method is used. Not all entries were included at each locale. Only selected trials from Olton are included in this report, since yields from Hereford were greatly reduced because of severe hail damage.

The variety and advanced selection trial at Olton (Table 1) was planted April 4 and harvested on July 24. The outstanding entries in the Olton trial were: Norgold "M", Lemhi Russet (Idaho seed source) and Norgold Russet #10. Based on overall performance, other russet entries deserving mention included, Norgold Russet #10-7, AD 7377-1, MnTX 8-57-1 Ru and Norgold Russet. The relative rank of the Norgold Russet strains, based on total yield, was as follows: Norgold "M", Norgold #10-7, Norgold #7, Norgold Russet (ND), Norgold #10, Norgold #35, Norgold #19 and Norgold Russet (Neb.). Of the strains tested over the past several years, Norgold "M" is the most consistent and outstanding from season to season. Outstanding red entries in the yield trial were the check variety Red LaSoda and New Norland #13.

Advanced selections from various breeding programs were tested under Texas conditions as can be seen in Tables 2 and 3. Several of these entries performed well relative to the check varieties. Those deserving mention based on overall performance include: NDTX 8-666-1 Ru, NDTX 8-349-4 R, ATX 8-71881-2 Ru, NDTX 8-731-1 R, ND 385-4 Ru, ND 651-9 and ND 677-7 (Table 2) and ATX 7-75115-1 Ru and CS 78144-4 Ru (Table 3).

Some 147, 1979 advanced selections were tested in 1981. Of these the 56 which will be advanced in 1982 are presented in Table 4. Those deserving mention, based on overall performance, include: NDTX 9-1069-4 Ru, TX 9-649-9 Ru, NDTX 9-1068-11 R, TX 9-684-1 Ru, TX 9-655-20 Ru, NDTX 9-851-1 R, ATX 9-7738-13 Ru, ATX 9-7738-8 Ru, ATX 9-75446-8 Ru, TX 9-682-10 Ru, TX 9-657-39 Ru, ATX 9-77254-3 Ru, ATX 9-77254-16 Ru and ATX 9-7738-9 Ru. These selections represent the finest material that we have seen since the breeding program was begun.

Texas Table 1. Total yield, percent of tubers over 4 ounces, average weight per tuber, specific gravity, vigor, maturity, and general rating of 33 potato varieties or selections grown at Olton, Texas - 1981.

Variety or Selection	Total Yield CWT/A	Percent of Tubers over 4 oz.	Average Weight/ Tuber in oz.	Specific Gravity	Vigor[1/]	Maturity[2/]	General Rating[3/]
Red LaSoda	440.6	82.1	5.0	1.068	3.9	3.5	3.5
ND258-1	376.1	78.5	3.9	1.072	3.8	3.5	2.9
New Norchip	320.9	70.9	3.3	1.076	3.7	2.9	2.9
Norgold "M"	320.0	77.7	4.1	1.064	3.3	3.6	4.4
Lemhi Russet (Id)	316.3	86.7	5.1	1.083	3.9	2.7	4.2
New Norland #13	311.3	85.4	5.2	1.062	3.0	3.3	3.5
WC 521-12	308.4	77.0	4.5	1.095	3.5	2.2	2.8
Norgold #10-7	269.2	67.2	4.3	1.062	3.3	3.6	3.5
AD 7267-1	290.1	76.6	4.7	1.064	3.6	2.2	3.5
Norgold #7	274.1	84.9	5.0	1.075	3.5	3.6	3.0
AD 7377-1	269.5	88.9	6.4	1.059	3.8	2.8	3.7
MnTX 8-57-1 Ru (Mn)	263.4	74.9	4.1	1.064	3.2	3.5	3.3
ND 388-1 Ru	251.8	79.0	3.9	1.076	3.2	3.5	3.3
Norgold Russet (ND)	244.5	74.1	4.1	1.068	2.9	3.8	3.5
Norgold #10	244.2	78.1	4.3	1.062	3.0	3.7	4.4
Norgold #35	243.4	66.7	3.9	1.063	3.7	2.8	3.8
Norgold #19	240.2	73.9	4.5	1.061	3.3	3.2	3.7
ND 463-1 R	231.7	78.8	3.6	1.072	2.7	4.0	2.9
TX 6-001-8 W	228.3	68.5	3.3	1.058	2.7	3.8	3.0
Lemhi Russet (Neb)	221.9	78.2	5.0	1.077	3.8	2.3	3.6
Norgold Russet (Neb)	221.0	77.2	4.0	1.066	2.6	3.9	3.3
MnTX 9-46-1 Ru	213.2	80.5	4.0	1.077	3.6	3.0	3.5
Neb 234	200.7	86.2	2.7	1.071	2.8	3.7	2.9
ND 146-4 R	200.4	62.0	2.9	1.068	2.9	4.3	2.8
Batouche	194.0	79.2	5.2	1.069	2.7	3.3	3.5
NDA 8694-3	192.0	70.6	3.6	1.069	2.8	4.0	3.1
NDTX 6-344-1 R	191.4	55.0	3.3	1.069	2.4	3.8	2.9

Continued

Texas Table 1. Continued

MnTX 8-57-1 Ru (ND)	189.1	81.8	4.3	1.066	2.2	3.8	3.5
NDD 143-1	187.3	68.5	3.9	1.069	3.1	3.7	3.8
NDTX 5-15-1 Ru	170.2	50.1	2.6	1.073	2.9	4.0	2.9
TXND 14-1 Ru	165.0	72.4	4.5	1.064	2.8	3.8	3.3
Bel Russ	151.0	69.3	3.2	1.077	2.8	3.7	3.0
ND 8767-10 R	111.8	70.1	4.1	1.074	2.6	3.9	3.1
Average	244.8	74.9	4.2	1.069	3.2	3.4	3.4
L.S.D. (.05)	44.7	9.9	0.9				

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

Texas Table 2. Total yield, percent tubers in 2 size grades, average weight per tuber, vigor, maturity and general rating of 20 North Dakota, Texas, Idaho-Texas and North Dakota-Texas advanced selections and 2 check varieties of potatoes grown at Olton, Texas - 1981.

Selection or Check Variety	Total Yield CWT/A	Percent Tubers by Number		Average Weight/ Tuber in oz.	Vigor[1/]	Maturity[2/]	General Rating[3/]
		Under 2 in.	Over 2 in.				
Red LaSoda	468.7	41.3	58.7	5.2	3.8	2.9	3.8
ND 677-7	467.0	49.5	50.5	4.8	4.0	2.3	3.3
NDTX 8-349-4 R	435.8	53.8	46.2	6.0	3.5	3.0	3.3
ND 651-9	332.8	40.6	59.4	4.8	3.5	3.0	3.3
ND 445-1	287.5	52.1	47.9	4.9	3.0	3.3	3.0
ND 115-21 R	282.3	68.1	31.9	4.0	3.0	4.3	3.0
NDTX 8-666-1 Ru	278.8	69.8	30.2	3.8	3.3	3.5	3.7
Norgold Russet	256.1	68.2	31.8	4.1	3.0	3.8	3.5
ATX 8-71881-2 Ru	250.9	59.3	40.7	4.3	3.3	3.3	3.0
ND 410-19	240.5	56.3	43.7	4.2	3.3	3.3	3.0
NDTX 671-10 Ru	235.2	50.0	50.0	4.4	2.7	3.5	3.0
ND 457-17	231.7	76.9	23.1	2.8	3.3	3.5	2.9
ND 606-21 Ru	216.1	89.7	10.3	2.9	3.3	3.7	2.9
ND 552-2 Ru	216.1	64.2	35.8	3.5	2.0	3.8	2.3
NDTX 8-731-1 R	212.6	41.5	58.5	5.2	2.8	3.0	3.0
ND 612-9	209.1	76.5	23.5	3.1	2.8	3.8	2.9
ND 671-2 Ru	198.6	88.9	11.1	3.0	3.0	3.5	3.3
TX 8-458-2 Ru	195.1	71.1	28.9	3.7	3.3	3.2	3.0
ND 779-4	181.2	67.8	32.2	3.1	2.8	3.8	3.0
ND 385-4 Ru	174.2	66.7	33.3	4.1	3.5	3.5	3.5
ND 728-13 Ru	130.7	79.1	20.9	2.8	2.9	4.0	2.9
NDTX 8-418-1 Ru	57.5	82.3	17.7	2.3	2.4	3.5	3.2

Continued

Texas Table 2. Continued

Average	252.7	64.3	35.7	4.0	3.1	3.4	3.1
L.S.D. (.05)	96.7	15.4	15.4	0.9			

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

Texas Table 3. Total yield, percent tubers in 2 size grades, average weight per tuber, vigor, maturity and general rating of 25 advanced selections (Texas seed) from breeding programs in California, Idaho, Minnesota, Norgh Dakota, Texas and The Campbell Institute for Agricultural Research (discontinued program) and two check varieties of potatoes grown at Olton, Texas - 1981.

Selection or Check Variety	Total Yield CWT/A	Percent Tubers by Number		Average Weight/ Tuber in oz.	Vigor[1/]	Maturity[2/]	General Rating[3/]
		Under 2 in.	Over 2 in.				
Red LaSoda	515.8	50.6	49.4	4.7	4.3	2.3	3.7
ATX 7-75115-1 Ru	240.5	66.7	33.3	3.7	2.8	3.5	3.5
Norgold Russet	215.2	60.1	39.9	4.4	2.9	3.3	4.0
TX 6-001-8 W	205.6	75.7	24.3	3.1	2.8	4.0	3.0
AS 433-2	186.4	46.3	53.7	4.8	2.4	3.5	3.5
CS 78144-2 R	155.1	72.7	27.3	3.2	2.0	3.5	3.0
CS 76111-14	153.3	61.6	38.9	3.9	2.4	3.5	3.3
CS 78144-4 R	143.8	68.9	31.1	3.6	2.7	4.0	3.7
CS 7743-24 R	132.4	56.0	44.0	4.4	1.9	3.8	3.3
CS 77129-18	129.8	63.4	32.6	4.2	2.4	3.5	3.3
NDD 358-9	126.3	80.0	20.0	2.7	2.5	3.5	3.2
CS 73105-2 R	126.3	34.9	65.1	4.8	3.0	3.8	3.0
CS 78211-25	125.5	63.6	36.4	3.5	1.8	4.0	2.8
TXND 14-1 Ru	124.6	64.4	35.6	3.5	2.7	4.0	3.2
TX 7-341-4 Ru	119.4	79.1	20.9	2.4	2.7	3.5	3.0
CS 78147-2	119.4	62.6	37.4	3.9	2.4	3.8	3.2
MnTX 8-44-5 Ru	117.6	70.3	29.7	3.2	2.7	3.8	3.3
TX 7-336-26 Ru	116.7	72.1	27.9	2.8	2.3	3.5	3.0
CS 78235-10 R	80.2	80.8	19.2	2.5	2.7	3.0	2.9
CS 77118-4 Rd	80.2	59.8	40.2	5.0	1.9	3.3	3.4
TX Early Norgold	77.9	80.1	19.9	2.2	2.4	3.3	3.0
CS 7837-18 R	74.1	83.9	16.1	2.8	1.8	3.9	3.3
CS 77127-14	61.9	94.5	5.5	2.6	2.2	3.5	3.0
CS 78211-2	61.0	64.0	36.0	3.0	2.5	2.6	2.8
NDTX 7-554-2 Ru	43.6	90.9	9.1	1.8	1.4	3.3	2.9
CS 78211-4	28.8	57.8	42.2	2.8	2.0	2.9	2.8
TX 7-157-1 Ru	12.2	66.7	33.3	3.7	2.5	2.5	2.8

Continued

Texas Table 3. Continued

Average	132.3	67.8	32.1	3.5	2.4	3.4	3.2
L.S.D. (.05)	83.4	13.0	13.1	0.9			

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

Texas Table 4. Total yield, percent tubers in 2 size grades, average weight/tuber, vigor, maturity and general rating of 56 Idaho-Texas, North Dakota-Texas, Minnesota-Texas and Texas advanced selections (Texas seed) and 2 check varieties of potatoes grown at Olton, Texas - 1981.

Selection or Check Variety	Total Yield CWT/A	Percent Tubers by Number		Average Weight/ Tuber in oz.	Vigor[1/]	Maturity[2/]	General Rating[3/]
		Under 2 in.	Over 2 in.				
Red LaSoda	435.6	36.6	63.4	5.0	3.5	2.8	3.5
ATX 9-77266-2 Ru	407.7	54.2	45.8	3.9	3.0	3.3	3.5
NDTX 9-1069-4 Ru	392.0	60.8	39.2	4.2	3.5	3.5	3.8
TX 9-646-4 Ru	390.3	60.3	39.8	4.3	3.5	3.9	3.4
TX 9-649-9 Ru	367.7	45.5	54.5	5.1	3.0	3.3	3.8
NDTX 9-1068-11 R	365.9	40.3	59.7	5.6	3.0	2.9	3.5
TX 9-684-1 Ru	34.50	57.1	42.9	4.5	3.5	3.3	3.7
NDTX 9-993-5 W	338.0	45.8	54.2	4.5	3.3	3.0	3.2
TX 9-652-10 W	334.5	44.5	55.5	4.9	3.7	2.8	3.5
TX 9-646-6 Ru	304.9	28.2	71.8	6.1	3.7	2.5	3.3
TX 9-657-49 Ru	301.4	47.3	52.7	4.8	2.0	4.0	3.0
ATX 9-77259B-5 Ru	299.7	76.3	23.7	3.4	2.8	3.5	3.5
TX 9-655-20 Ru	296.2	45.8	54.2	5.5	3.4	2.8	3.7
NDTX 9-820-1 R	289.2	49.8	50.2	4.4	3.2	3.3	3.7
NDTX 9-851-1 R	282.3	42.9	57.1	4.6	3.0	2.9	3.9
ATX 9-77259B-8 Ru	278.8	46.2	53.9	4.9	3.2	3.0	3.8
TX 9-657-36 W	273.6	44.8	55.2	4.3	2.8	3.3	3.5
TX 9-656-22 Ru	268.3	58.8	41.2	4.4	3.0	3.5	3.3
ATX 9-75446-4 Ru	261.4	85.2	14.8	3.0	2.3	4.0	3.0
ATX 9-7738-13 Ru	259.6	66.0	34.0	3.5	3.3	2.3	3.5
ATX 9-7738-8 Ru	250.9	56.4	43.6	4.2	2.8	3.0	3.8
TX 9-581-2 Ru	249.2	54.8	45.2	4.3	3.3	2.7	3.4
Norgold Russet	247.4	72.4	27.6	3.9	2.8	3.5	3.5
ATX 9-75446-8 Ru	237.0	60.5	39.5	4.9	2.4	3.8	3.4
ATX 9-75446-9 Ru	235.2	62.5	37.5	3.4	2.0	3.5	2.9
TX 9-682-10 Ru	224.8	73.6	26.4	3.0	2.5	3.3	3.7
NDTX 9-1012-1 Ru	221.3	67.9	32.1	3.9	3.3	3.3	3.5
TX 9-652-20 Ru	214.3	55.8	44.2	4.6	3.0	3.3	3.5
NDTX 9-1015-1 Ru	212.6	57.8	42.2	4.0	2.5	3.8	3.7
TX 9-655-23 Ru	210.8	63.3	36.7	3.2	3.0	3.8	3.3

Continued

Texas Table 4. Continued

ATX 9-77721-1 Ru	207.4	52.1	47.9	4.0	2.8	3.8	3.3
NDTX 9-867-1 Ru	198.6	70.3	29.7	4.0	3.0	3.7	3.2
TX 9-649-20 Ru	196.9	64.1	35.9	3.6	3.0	3.3	3.5
TX 9-652-8 Ru	188.2	63.1	36.9	3.5	2.9	3.0	3.3
TX 9-657-39 Ru	186.4	39.5	60.5	5.2	1.3	3.0	4.0
ATX 9-77259B-7 Ru	181.2	76.3	23.7	2.4	2.5	2.9	3.3
ATX 9-7152-2 Ru	179.5	60.2	39.8	3.6	3.3	2.9	3.4
ATX 9-77236-3 Ru	174.2	95.8	4.2	2.3	2.5	3.7	4.0
ATX 9-77254-3 Ru	170.8	77.8	22.2	2.9	3.9	1.9	3.5
ATX 9-77529-5 Ru	163.8	68.6	31.4	3.6	2.8	2.8	3.0
ATX 9-77236-8 Ru	162.0	75.2	24.8	2.8	2.8	3.3	3.2
ATX 9-77547-1 Ru	158.6	76.9	23.1	3.3	2.8	3.8	3.3
ATX 9-77199-1 W	151.6	57.5	42.5	4.2	2.8	3.3	3.3
ATX 9-77254-4 Ru	148.1	82.2	17.8	2.7	2.5	3.3	3.3
ATX 9-77254-16 Ru	146.4	57.1	42.9	3.2	3.5	2.8	3.3
NDTX 9-880-1 R	144.6	67.0	33.0	3.3	2.0	3.8	3.2
ATX 9-77254-5 Ru	139.4	85.2	14.8	2.4	3.8	1.9	3.0
ATX 9-7738-9 Ru	135.9	55.0	45.0	4.3	3.0	3.0	3.8
TX 9-655-10 Ru	134.2	52.7	47.3	4.2	1.5	3.5	3.0
TX 9-682-8 Ru	132.4	57.8	42.2	3.6	3.8	2.5	3.4
ATX 9-75446-1 Ru	132.4	78.0	22.0	2.7	2.2	4.3	3.2
ATX 9-75446-2 Ru	132.4	76.6	23.4	2.6	1.9	3.3	2.9
ATX 9-77153-3 Ru	128.9	64.7	35.3	3.5	2.0	3.3	3.0
ATX 9-77255-7 Ru	118.5	82.5	17.5	2.8	3.0	3.0	3.5
TX 9-677-1B Ru	95.8	69.1	31.0	2.7	2.3	4.0	3.0
ATX 9-77262-2 Ru	87.1	81.4	18.6	2.3	2.4	3.0	3.3
TX 9-685-1 Ru	83.6	54.2	45.8	3.9	2.3	3.8	3.5
ATX 9-77236-9 Ru	66.2	82.9	17.1	2.7	1.5	3.0	2.8
Average	223.1	61.8	38.2	3.8	2.8	3.3	3.4
L.S.D.(.05)	68.0	14.0	14.0	1.2			

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early

3/ 1 = very poor to 5 = excellent

VIRGINIA

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1981 Variety and Seedling Evaluations

General Plot Procedures and Growing Conditions. For each test the plot size and number of replications were as follows: First Year Observational Trial, 20 hill (20 foot) plots with one replication; Intermediate Trial, 25 hill (25 foot) plots with four replications; and Advanced Trial, 25 hill (25 foot) plots with four replications. All trials were planted at 3 foot row spacing on March 10 and harvested on July 6. All plots received 1200 lb. 10-10-10/acre placed in a band at planting. TEMIK systemic insecticide was banded in the seed furrow at 3 lbs. a.i./acre. VYDATE (1 pt./acre) and FURADAN (1 pt./acre) were applied as a foliar spray on June 11 to control Colorado potato beetles. Corn borer infestation was high by June 10 in all plots and could not be adequately controlled. To control weeds 1.25 lb. LEXONE/acre was applied at drag-off (April 8). Rainfall was average to above-average at Painter during March through May. On June 18, 2.5 inches of H_2O was applied to all plots to alleviate moisture stress which occurred in June. On the evening of June 18 an additional 0.9 inch of H_2O was added to the plots through precipitation. Following this June 18 irrigation-rainfall, a hot, humid environment persisted. The authors feel that this environment in combination with the corn borer injury allowed for development of Bacterial Soft Rot in the stems which brought about a rapid decline in the foliage by late June.

Tubers were hand harvested and graded with a chain type grader that retained all tubers 1-7/8 inches in diameter or larger. Due to improper handling of chip samples, valid ratings could not be made.

Experimental Results. The results for the round whites within the Advanced Trial are shown in Table 1. The yield for Pungo was below traditional levels and less than that observed for Superior. This suggests that yields of the later maturing clones (Pungo) may have been supressed more by the canopy decline than were the earlier maturing clones (Superior). Top yields were attained with B6987-29 (Belchip) and LaChipper. LaChipper has a history of susceptability to air-pollution injury which implies that air quality was not a factor which affected yields at Painter during 1981.

Specific gravity was lower than usual in the Advanced and Intermediate trials with Pungo and Superior averaging 1.057 and 1.064, respectively. The "usual" specific gravity is 1.075 for Pungo and 1.070 for Superior at Painter.

The round white results for the Intermediate Trial are shown in Table 2. Pungo outyielded all of the unnamed clones (at 325.4 cwt/acre), but had a low specific gravity (1.058). The clones B8757-7, B8503-13, and B9140-4 had

specific gravities in the 1.070-1.075 range and yields in the 220-260 cwt./acre range. These values were close to those observed for Atlantic at Painter this year.

The results for the russet clones grown in the Advanced and Intermediate trials can be seen in Table 3. In general, yields realized with the russet clones at Painter have been somewhat lower than the round whites. Irrigation studies conducted at Painter in 1981 which contained several russet clones (data not shown) suggests that a more intensive irrigation management program may be required for larger russet yields in eastern Virginia.

Virginia Table 1. Advanced Trial, Round Whites. Characteristics of Potato Varieties and Seedlings at Painter, Virginia in 1981.

Clone	Yield, Cwt/Acre (1-7/8"+)	Specific Gravity 1.0 omitted	Tuber[1/] Shape	Vine[2/] Mat.
LaChipper	351.0	65	4	5
B6987-29 (Belchip)	337.6	63	1	7
B8710-1	319.7	63	4	5
B8710-16	318.9	63	4	7
Superior	305.7	61	5	4
B9224-6	296.9	66	5	5
B8724-2	296.8	68	5	5
B9144-5	293.7	70	5	5
B9127-6	293.2	56	5	5
B9140-14	292.6	63	1	5
B8615-2	289.2	70	2	4
B9286-4	286.9	58	3	5
B9127-1	283.4	52	5	5
B9311-7	281.1	68	4	5
Pungo	277.9	55	5	7
Norchip	268.8	68	4	6
B9139-1	267.8	60	5	7
B8091-8	267.0	69	5	7
B7154-10	239.1	57	4	5
B9152-44	234.1	68	4	7
B9018-12	230.6	67	5	4
B8907-4	219.0	59	5	5
B8799-13	215.2	66	5	4
Atlantic	209.2	72	5	5
B6969-2	207.8	59	5	5
B9146-1	201.2	59	5	-
B7805-1	197.0	59	5	7
B6987-184	178.5	69	1	7
B8599-42	153.9	67	4	5
L.S.D. (0.05)	36.3	-	-	-
L.S.D. (0.01)	48.0	-	-	-

1/Tuber Shape: 1=round (spherical); 2=most round; 3=round to oblong; 4=most oblong; 5=oblong; 6=oblong to slightly long; 7=oblong to long; 8=most long; 9=long (cylindrical).

2/Vine Maturity: 1=very early; 3=early; 5=medium; 7=late; 9=very late; 2, 4, 6, 8=intermediate stages.

Virginia Table 2. Intermediate Trial, Round Whites. Characteristics of potato varieties and seedlings at Painter, VA 1981.

Clone	Yield, Cwt/Acre (1-7/8" +)	Specific Gravity 1.0 Omitted	Tuber[1/] Shape	Vine[2/] Mat.
Pungo	325.4	58	5	7
B9384-6	280.2	62	5	5
B9335-3	276.5	68	5	7
Superior	269.8	66	5	5
B9423-4	266.4	61	4	7
B6986-2	260.6	62	5	7
B8757-7	258.9	70	5	7
B9130-24	252.2	69	5	6
B9140-4	238.6	75	4	5
B9282-12	231.2	63	4	-
B9445-2	227.2	60	5	5
B9473-9	223.9	57	5	5
B8503-13	223.2	75	5	6
Atlantic	221.7	75	5	7
B8706-7	221.0	66	5	7
B9140-6	218.5	65	5	7
B9455-3	216.6	71	5	7
B9473-2	213.3	57	5	4
B9497-2	212.9	74	5	5
B9489-2	211.3	77	1	7
B7151-4	207.5	62	4	9
B9335-60	196.3	66	4	5
B9361-1	195.7	76	1	5
B9140-17	194.4	67	5	7
B9409-1	193.4	71	5	7
B9336-24	188.3	70	5	5
B9140-32	187.2	75	4	7
B9335-7	183.1	69	4	4
B9439-4	181.8	66	5	5
B9335-35	180.3	78	4	5
B9481-2	178.5	-	5	5
B9467-1	178.3	71	5	5
B9344-5	178.2	70	5	5
B9148-4	177.1	71	5	7
B9337-12	174.7	66	5	5
B9340-13	165.7	72	4	9
B9279-9	160.7	67	5	-
B8477-17	148.3	61	5	7
B9335-15	133.7	68	5	5
B8751-6	130.2	69	5	9
L.S.D. (0.05)	30.9	-	-	-
L.S.D. (0.01)	40.8			

1/ See Table 1.
2/ See Table 1.

Virginia Table 3. Selected characteristics for Russet clones grown in the Advanced and Intermediate Trials at Painter, Virginia in 1981.

Clone	Yield, Cwt/Acre (1-7/8"+)	Specific Gravity 1.0 omitted	Tuber[1]/ Shape	Vine[2]/ Mat.	Tuber[3]/ Conf.
		Advanced Trial			
B8977-2	223.5	54	4	9	4
B9137-9	222.7	59	8	5	4
B7583-6	212.1	64	8	7	7
Norgold Russet	211.3	55	2	5	5
B8943-4	191.4	66	8	7	4
B9147-3	164.2	54	8	7	7
B8972-1	144.6	68	8	5	5
B8833-6	128.8	70	8	5	7
L.S.D. (0.05)	39.4	-	-	-	-
L.S.D. (0.01)	53.6				
		Intermediate Trial			
B8934-4	243.9	59	4	7	8
B9419-6	220.7	66	2	5	5
Norgold Russet	197.5	58	4	5	4
B9164-1	185.9	75	8	7	8
B9398-2	185.9	70	3	5	6
B9217-7	168.4	62	4	5	5
B9419-1	145.2	65	8	5	7
B9399-27	116.2	56	2	5	3
B9434-18	81.3	71	8	5	6
B9597-7	81.3	68	2	5	7
B9221-14	69.7	58	8	5	4
L.S.D. (0.05)	19.0				
L.S.D. (0.01)	30.8				

1/ See Table 1.

2/ See Table 1.

3/ Tuber Conformation: 1=very poor; 5=fair; 7=good; 9=excellent.

WASHINGTON

M. W. Martin and N. M. Holstad

Two regional trials were conducted in Washington in 1981, one in a commercial potato circle, south of Prosser, and the other on the WSU research farm near Othello, under solid set irrigation. At Prosser, 180 lbs/a each of NPK + 5 lbs Zn were plowed down, 50 lbs N, 20 lbs P, 20 lbs K, 1 lb Zn were applied at planting and 225 lbs N/a applied in irrigation water during the season. Very vigorous plant growth resulted. The plot was planted April 24. For insect control applied 3 lbs ai/a Thimet before planting and 3 lbs ai/a Temik at emergence, followed by a Monitor spray in early August. For weed control applied 2/3 pt/a Sencor + 1/2 gal/a Eptam through the sprinkler system at layby. For disease control the field was airplane sprayed with Dithane at layby followed by 3 applications of Duter in the irrigation water. A little over 30 in. of irrigation water was applied during the season. We had a cool spring and mild summer which was ideal for potato growing, except for a few days of high temperature stress in early fall. Vines were beat off Sept. 9, as early dying was becoming very evident in susceptible cultivars. The plots was harvested Sept. 15. Results are shown in Tables 1 and 2.

At Othello 360 lbs N, 200 lbs P and 250 lbs K were plowed down. Planting was done April 15. Eptam at 1/2 gal/a was applied at layby for weed control. Insect control was accomplished by 2 sprays of Monitor and 2 sprays of Imidan. The plot was sprayed once with the fungicide Kolospray. The plot was dug on Oct. 23, after susceptible cultivars had been dead for some time from early dying diseases. Results are shown in Tables 3 and 4.

With the exception of AD74135-1, we have seen all the regional trial entries in numerous trials over the past few years and AD74135-1 was included in 6 other trials in 1981. Based on their performance in regional and other trials, we compiled the following "performance profile" narratives to describe the potential value and use of these lines in the Northwest.

Russet Burbank: Looked better than usual in 1981, had good yield and a fair percent No. 1's, but still rougher than any other line in trial and had serious brown center and internal brown spot. It had fair solids, stored well, and fried well except for sugar ends. It is susceptible to all the early dying diseases but has good resistance to scab and Sencor damage. It had very little shatter bruise but some blackspot bruising. Hard to replace but has many problems.

Lemhi: Very nice oblong russet with good yield and high percent No. 1's. Few external or internal problems except for its serious blackspot susceptibility. It seldom shows as much hollow heart as Russet Burbank in Washington trials, except under excessive irrigation. It had good solids, low sugars and fried well, but often had limp fries. It did not store as well as Russet Burbank, sprouted sooner and had some storage rot problems. It has good resistance to scab but is susceptible to all the early dying diseases and is not as resistant to Sencor damage as Russet Burbank. Because of bruise susceptibility will find limited use, mostly for processing when it can be taken directly from field to factory.

Norchip: An ordinary, round, white chipper with fair yield and good percent No. 1's. It had few external or internal problems. Had only fair solids but fried well. Broke dormancy and sprouted early but didn't have storage rot. Appeared to have resistance to scab and Sencor but was very susceptible to all early dying diseases. Had very little shatter bruise but some blackspot. Has limited use in West, for chipping industry.

WnC521-12: A blocky chipper or french-frying line with a light net skin, should be compared with Kennebec. Produced a good yield and high percent No. 1's, set low numbers of tubers which got very large so had a high percent over 12 oz. Had few external or internal blemishes except for an extreme tendency to shatter bruise. Had high solids early in the season. Tubers were very smooth and did not produce second growths. They occasionally had serious hollow heart. It had very good solids, low sugars and produced excellent fries. Stored fairly well but was very susceptible to bacterial soft rot. Susceptible to scab and the early dying diseases, but less so than Kennebec. Because of susceptibility to bruising and scab may not be acceptable, but should be looked at for early season processing.

WnC672-2: A round, flat, medium-russeted chipping line that might have some use for french fries because of number of tubers over 12 oz. Good yields and high percent No. 1's. Tubers did not produce many second growths but were often rough in shape. Seldom much hollow heart but had serious weakness to internal necrosis and occasionally had serious shatter bruising. It had good solids, very low sugars and made excellent fries, although many were too short. Stored fairly well but quite susceptible to bacterial soft rot and fusarium dry rot. Susceptible to scab and early blight, but had some resistance to other early dying diseases. It's somewhat sensitive to Sencor. Because of susceptibility to bruising, scab and internal problems and its short french fries it will probably have limited acceptance as a cultivar in the Northwest.

AD7267-1: Had long tubers with a medium-russet skin. Yielded very well in 1980 but didn't do as well in 1981. Had large tubers and high percent No. 1's. Had very low solids, high sugars and fried very poorly. Seldom showed second growth but tended to have rough shape. Occasionally had hollow heart and had rather serious internal brown spot in one regional trial. Stored fairly well but often had bacterial soft rot, thumb nail cracking and blackspot. Susceptible to scab, somewhat sensitive to Sencor, and susceptible to all the early dying diseases. Because of its poor processing quality, internal, bruising and rot problems will probably not be used in the Northwest.

A72545-2: Oblong, medium-russeted tubers. Yielded very well with high percent No. 1's and high proportion of tubers over 12 oz. Tubers had few external blemishes except for rather serious amount of blackspot bruising and thumb nail cracking. Occasionally had serious internal necrosis. Had acceptable solids, low sugars and fried well on first appearance. The most serious deficiency of this line is its extreme amount of after-cooking darkening. It stored well with not much rotting. Very susceptible to scab and susceptible to early blight, but good resistance to Verticillium and Sclerotinia wilts and Sencor. Because of after-cooking darkening and susceptibility to scab and bruising will probably not be commercially grown.

A72685-2: Oblong, medium-russeted tubers. Very good yields, good percent No. 1's, rather large proportion over 12 oz. Seldom produced knobs but tended to have rough shape. Occasionally had rather serious hollow heart and internal brown spot. Had good solids, rather low sugars, and produced fair fries but they were usually limp, sometimes variable in color with sugar ends and developed some after-cooking darkening. Did not store well, had short dormancy and shriveled badly. Had some storage rot and blackspot bruising, about like Russet Burbank. Susceptible to scab, somewhat sensitive to Sencor, susceptible to early blight, but some resistance to Verticillium and Sclerotinia wilts. Because of its poor storability, handling and frying characteristics and susceptibility to scab it will probably not be acceptable as a processing cultivar in the Columbia Basin. It might have some fresh market potential because of its high productivity.

AD7377-1: Long, heavy-russeted tubers. Produced very high yields in 1980 but didn't do so well in 1981. Had good percent No. 1's with few knobs but had a rough shape, often being flattened and pear shaped. Seldom had hollow heart but often troubled with internal brown spot and other internal blemishes. It had very low solids and high sugars and did not fry well. Had less blackspot than Russet Burbank but showed some thumb nail cracking. Very resistant to scab but susceptible to the early dying diseases and quite sensitive to Sencor. Because of its poor cooking quality, roughness and poor storability, will probably not be used in the Northwest.

AD74135-1: Long, medium-russeted tubers. Produced a very good yield with good percent No. 1's and moderate proportion over 12 oz. Had a nice external appearance but had a weakness to growth cracking and internal necrosis. Had a strong tendency toward pear shape. Rather low solids, fairly high sugars and produced fries that were barely acceptable. Had short dormancy, some thumb nail cracking and blackspot bruising. Good scab resistance but is very susceptible to all early dying diseases. A high yielding, nice looking line but its poor storability, processability and bruise susceptibility will probably make it unacceptable. Worthy of further evaluation.

In addition to the regional trials we screened through hundreds of other promising new lines coming out of U.S. and Canadian breeding programs and took a thorough look at new cultivar releases. Most show little potential for use in the Northwest. Following are "performance profiles" for the most interesting or promising of the new cultivars.

Nooksack: A processing or fresh market cultivar with blocky, medium-russeted tubers that are smooth and often flattened, sometimes having a pear shape. It produces few stems and tubers, so tubers generally large in size. Seldom has external or internal blemishes but will growth crack if irrigation rates are high. Because of extreme dormancy needs to be warmed for an extra long period before planting, which sometimes leads to seed piece rot and poor stands. Has few eyes so large seed pieces are needed. It usually yields less total than Russet Burbank but has high percent No. 1's and often yields more total U.S. No. 1's. Has an unusual, upright bushy plant and requires less irrigation or fertilization than most cultivars, especially Russet Burbank.

Has high solids, low sugars and produces excellent fries. Can not be harvested as early cultivar, must be allowed to mature and suberize properly. Very little bruising and stores well, but some storage rots. Very resistant to scab and Sencor and some resistance to Colorado potato beetle but is susceptible to all the early dying diseases, although not as much so as Russet Burbank. Because of serious internal problems being experienced in Russet Burbank and other cultivars and the fact that more growers are learning how to get a good stand of Nooksack with resulting good yields, this cultivar will continue to grow in importance.

Targhee: Oblong tuber with heavy russeting that often produces elephant skin. Produces medium to good yield with medium percent No. 1's. Seldom produces second growths but tends to be rough and non-uniform in size or shape and sometimes has growth cracking. Occasionally has serious hollow heart and often has serious blackspot or shatter bruising. It is susceptible to leafroll net necrosis. It has only fair solids, tends to build up sugars in storage and generally produces rather poor french fries. It stores fairly well but has rather short dormancy and soft rots quite easily. It has excellent resistance to scab, is not very sensitive to Sencor and has some resistance to Verticillium, but is susceptible to other early dying diseases. Has only medium yield, storability and cooking qualities and serious bruising and internal problems so not good for processing. Might have limited potential for a fresh market.

Butte: Unless fertilized and watered quite heavily and grown over a long season does not produce good yields and will produce pear shaped tubers. Tubers are long and smooth with a medium-russeted skin and few external or internal blemishes, so has high percent No. 1's. Has good solids and baking quality but has high sugars and dark fries after storage. Sprouts early and often has shatter bruise and storage rot problems. Has good scab resistance but is very susceptible to early dying. Should be evaluated in the Columbia Basin for fresh market potential, being sure to add sprout inhibitors if it is stored.

Russette: Produces low yields of small oblong, flattened tubers with heavy russeting. Has a serious weakness to growth cracking and often has elephant skin and hollow heart. It has long dormancy and stores well. Has good solids and eating quality but builds up sugars in storage which produce dark fries. It is somewhat susceptible to scab and is susceptible to early dying. Will probably have limited use in the Northwest because of low yields and susceptibility to diseases.

BelRus: An attractive cultivar which produces a low yield of long, heavy-russeted tubers with few external or internal blemishes except a strong tendency toward elephant skin, especially on lighter soils. It is a good eating potato. Is susceptible to scab and early dying. Will probably find very limited use in the Northwest because of low yields and disease susceptibility.

Allagash Russet: An attractive cultivar with low yields of smooth, oblong, russet tubers with few external or internal blemishes except some blackspot bruising. It has fair cooking quality similar to Norgold. Is very susceptible to scab and early dying. Probably will not find a place as a fresh market line in Northwest because of low yields and disease susceptibility.

Norgold Russet: Has become established as a line to beat for early fresh market because it has the desired oblong russet type, is very early, has few internal problems, and can be handled and shipped with few bruising or rot problems. It is not high yielding, has serious blackleg and early dying problems, has low solids and only marginal culinary quality but its scab resistance and attractive appearance will help it retain its popularity.

Norgold M: One of the better of a series of Norgold selections made in Nebraska which have larger plants that are not so susceptible to early dying diseases, and consequently, usually have large tubers and higher yields. Unfortunately, this more vigorous top growth seems to cause more roughness and hollow heart than is found in standard Norgold. In most of our trials though, Norgold M has been clearly superior to Norgold. This selection and some of its sister selections should be looked at more extensively by Norgold growers in the Columbia Basin.

LC-1: An interesting new line picked up a few years ago as a rogue in a seed field. It has a small, compact plant which produces a medium yield of smooth, oblong, medium-russeted tubers that do not get very large and usually have a pear shape. It is an early-maturing line that is very susceptible to early dying diseases but has a good scab resistance. Has few external or internal blemishes and has good bruise resistance. It has a storage rot problem but generally has had good storability, solids and cooking qualities in preliminary trials. As this line becomes available it deserves more extensive trials.

Washington Table 1. 1981 Western Regional Variety Trial on Sunheaven Ranch, south of Prosser, tuber growth and productivity factors.

Cultivar	Main Use[1/]	Shape[2/]	Skin Type	Emerge Rating[3/]	% Stand	E. Die Resist[4/]	Total cwt/a	Total US #1 cwt/a(%)	#1 over 12 oz cwt/a(%)	Under 4 oz cwt/a(%)	Other culls cwt/a(%)	Sp. Gr. (1.0--)
Rus Burbank	FF, FM	Lg	Med Rus	4.5	98	1.4	660	511(77)	159(24)	78(12)	72(11)	78
Lemhi	FF	Obl	Hvy Rus	3.8	95	1.3	693	570(82)	233(34)	65(9)	58(8)	84
A72545-2	FF, FM	Bl	Med Rus	3.0	95	3.7	711	637(90)	345(49)	54(8)	20(3)	74
A72685-2	FF, FM	Bl	Hvy Rus	3.3	89	3.7	908	744(82)	321(35)	83(9)	80(9)	82
AD74135-1	FF, FM	Lg	Med Rus	2.5	94	1.7	713	580(81)	249(35)	75(11)	58(8)	72
AD7267-1	FM	Lg	Med Rus	3.5	96	1.7	582	505(87)	266(46)	38(7)	37(6)	66
AD7377-1	FM	Obl	Med Rus	4.0	90	1.3	588	509(87)	134(23)	51(9)	29(5)	65
Norchip	Chp	Rnd	Wh	3.3	98	1.0	584	489(84)	69(12)	55(9)	40(7)	76
WnC521-12	Chp, FF	Bl	Lt Rus	3.5	85	2.3	697	598(86)	360(52)	56(8)	43(6)	88
WnC672-2	Chp	Rnd	Med Rus	4.8	99	3.7	675	566(84)	319(47)	49(7)	60(9)	81

1/ FF = French Frying, FM = Fresh Market, Chp = Chipper
2/ Lg = Long, Obl = Oblong, Bl = Blocky, Rnd = Round
3/ Emergence rated May 26, using 1-5 scale; 1 = slow, poor emergence, 5 = rapid, good emergence
4/ Early dying resistance rated just before harvest; 1 = very susceptible, plants dead, 5 = very resistant, no dying

Washington Table 2. 1981 Western Regional Variety Trial on Sunheaven Ranch, south of Prosser. tuber defects.

				External Defects (%)[1/]				Internal Defects (%)[1/]			
Cultivar	Scab Rating[2/]	Bruising[3/] Blksp	Bruising[3/] Shat	Growth Crack	Second Growth	Other Malform	No Ext Defects	Hollow Heart	Int Br Spot	Other Int Defects	No Int Defects
Rus Burbank	0.7	2.7	1.9	2	11	13	75	21	2	8	71
Lemhi	0.3	3.9	1.9	3	1	5	91	0	1	5	94
A72545-2	2.6	2.8	2.4	0	0	1	99	1	4	7	88
A72685-2	2.3	2.6	1.6	3	8	8	83	1	11	11	77
AD74135-1	0.3	2.2	1.0	0	4	8	88	0	4	7	89
AD7267-1	1.3	2.8	2.0	2	2	13	83	1	10	8	81
AD7377-1	0.3	2.4	2.1	3	3	15	80	1	7	13	80
Norchip	0.0	2.4	1.7	1	1	9	86	1	5	17	78
WnC521-12	2.0	1.9	3.2	9	0	4	85	0	7	19	75
WnC672-2	1.5	1.8	3.7	5	4	2	89	3	14	7	76

1/ Based on four 25-tuber samples (one from each rep)
2/ Scab rated on 0-5 scale; 0 = no scab, 5 = very severe common scab
3/ Tendency toward blackspot or shatter bruising determined by motor-driven hammer. Rated on 1-5 scale; 1 = no bruising, 5 = severe bruising

Washington Table 3. 1981 Western Regional Variety Trial at Othello, tuber, growth and productivity factors.

Cultivar	Main[1/] Use	Shape	Skin Type	% Stand	E. Die[2/] Resist	Total cwt/a	Total US #1 cwt/a(%)	#1 over 10 oz cwt/a(%)	Under 4 oz cwt/a(%)	Other culls cwt/a(%)	Sp. Gr. (1.0--)
Rus Burbank	FF, FM	Lg	Rus	98	3.5	480	294(61)	138(29)	90(9)	96(20)	81
Lemhi	FF	Lg	Rus	90	3	631	536(85)	294(47)	66(10)	29(5)	83
A72545-2	FF, FM	Lg	Lt Rus	86	4	720	613(85)	396(55)	67(9)	41(6)	81
A72685-2	FF, FM	Obl	Rus	79	3	713	539(76)	335(47)	77(11)	77(11)	82
AD74135-1	FF, FM	Lg	Rus	85	3	730	525(72)	318(44)	85(12)	120(16)	77
AD7267-1	FM	Lg	Rus	95	3	651	562(86)	388(60)	45(7)	44(7)	70
AD7377-1	FM	Lg	Rus	86	3	655	482(74)	284(43)	83(13)	90(14)	70
Norchip	Chp	Rnd	Wh	86	3	425	334(79)	63(15)	76(18)	15(4)	76
WnC521-12	Chp, FF	Obl	Buff	95	2.5	643	514(80)	318(49)	65(10)	68(11)	90

1/ FF = French Frying, FM = Fresh Market, Chp = Chipping
2/ Rated late August on 1-5 scale; 1 = dead, 5 = no plant dying

Washington Table 4. 1981 Western Regional Variety Trial at Othello, tuber defects.

		External Defects (%)[1/]				Internal Defects[1/]			
Cultivar	Blspt[2/] Bruise	Growth Crack	Second Growth	Other Malform	No Ext Defects	Hollow Heart	Int Br Spot	Other Int Defects	No Int Defects
Rus Burbank	2.1	1	9	12	78	0	40	11	49
Lemhi	3	1	2	1.5	95	0	3	3	94
A72545-2	1.9	2	3	0.4	94	3	26	0	74
A72685-2	2.1	2	7	1.8	89	3	15	5	80
AD74135-1	3.2	7	1.5	8	83	0	17	0	83
AD7267-1	2.2	0.5	2	2.5	93	0	3	6	96
AD7377-1	1	1.5	3	7	89	0	17	0	84
Norchip	0.6	0	0	1	97	0	8	5	87
WnC521-12	1.8	4	0.5	6	89	0	6	5	89

1/ Based on four 25-tuber samples (one from each rep)
2/ Blackspot bruising visual ratings; 1 = trace, 5 = very severe. Rating of 3 or above is serious

WEST VIRGINIA

R. J. Young

Test For Reaction To *Phytophthora Infestans* Potato Race-1,4

Late Blight Trial 1981. The 1981 late blight trial was conducted on the West Virginia Agriculture and Forestry Research Farm located at Reedsville, West Virginia. The farm is located at 1760' on atkins loam soil. Rainfall was abundant from March through July, averaging seven inches per month. August was dry with less than one inch of precipitation recorded. More normal levels of about three inches were recorded in September. Temperatures were near normal throughout the season. Test clones were hand planted on May 22 into preformed rows. Spacing between rows and between plants within rows measured 90 cm (36 inches), and about 23 cm (9 inches), respectively. Fertilizer and soil insecticides were incorporated into furrows at rates determined by soil test and Mfg. recommendation, respectively. Potato foliage was sprayed periodically with insecticide for maintenance. No fungicides were applied. Clones were evaluated on the basis of either five or eight hill non-replicated plots. Katahdin was planted into the outside boarder rows and into every third row throughout the plot, serving as inoculator-plants. These 'inoculum-source-plants' were inoculated with a suspension of zoospores/sporangia of *P. infestans* race-1,4 on July 29, 1981. Late blight symptoms developed slowly because of lower than normal precipitation through August. Evaluations were made on August 13 and again on August 20, 1981. Plants were determined susceptible or immune. An immune score indicates that no late blight symptoms were observed. Because of infrequent and low levels of precipitation through August, the possibility of escape should be considered. Consulting the West Virginia Report for 1979, 1980, and 1981, should give the reader a better idea of the reaction of specific clones to various races of *P. infestans*. The reaction of the andigenia material obtained from the Cornell and Agriculture Canada Breeding Programs to three races of *P. infestans* should be noted. No symptoms were observed in the clones tested in 1981 to race-1,4. In the 1980 test only the Agriculture Canada material was available for testing, and no symptoms were observed to race-0 of *P. infestans*. In 1979, when tested against race-1,3,4, five of 10 clones (Tarn) showed no symptoms, whereas four clones showed good polygenic resistance and one was susceptible. Poor sporulation also was noted when lesions developed on the andigenia material. See West Virginia table 1 for details of the 1981 test.

West Virginia Table I. Evaluation of seedling clones and varieties for resistance to Race - 1,4 *Phytophthora infestans*, 1981.

Field No.	Pedigree	Disease Reaction	Comments
	West Virginia Seed Stocks		
1501	Abnaki (R_o)	Susc.	Excellent sporulation
1502	Alamo (R_1)	Susc.	Good spores
1503	Boone (R_1)	Susc.	Good spores, mod. multi., eb. susc.
1504	Calrose (R_n)	Immune	No lb., eb. susc.
1505	Cascade	Susc.	Fair spores, eb. susc.
1506	Cherokee (R_1)	Susc.	Good spores
1508	Irish Cobbler (R_o)	Susc.	Good lesions with spores tips. 95% defoliated
1509	Katahdin (R_o)	Susc.	Good to exc. spores
1570	Kennebec (R_1)	Susc.	Good spores
1511	Merrimac	Susc.	Good spores
1512	Mohawk	Susc.	Good spores
1513	Nampa	Susc.	Good spores
1514	Norland (R_o)	Susc.	Only tips left. Good lesions with spores
1515	Ona	Susc.	Exc. sporulation
1517	Penn Chip (R_2)	Immune	Good foliage, no eb.
1718	Pentland Ace (R_3)	Immune	No lb., some eb.
1719	Russet Burbank	Susc.	Exc. sporulation
1720	Russet Rural	Susc.	Exc. sporulation
1721	Saco	Susc.	Good sporulation, good fol.-mod.-low multigenic
1522	Superior (Reg.)	Susc.	Good spores
1523	Superior (late) (R_n)	Immune	No lb., no eb.
1525	B3682-WV1 (R_2, R_3, R_4)	Immune	No lb., mod. eb.
1526	B3720-WV4 (R_n)	Immune	No lb., good fol.
1527	B5662-WV4 (R_n)	Immune	No lb., no eb.
1528	B5602-WV13 (R_n)	Immune	no lb., no eb.
1529	BR5991-WV16 (R_n)	Immune	No lb., sl. eb., good fol.
1530	BR5991-WV21 (R_n)	Immune	No lb., no eb., exc. fol.
1531	B6026-WV5 (R_n)	Immune	No lb., mod. eb., good fol.
1532	B6028-WV6 (R_n)	Immune	No lb., some eb.
1533	B6039-WV2 (R_n)	Immune	No lb., exc. fol., sl. eb.
1534	B6039-WV6 (R_n)	Immune	No lb., some eb., good fol.
1535	B6039-WV9 (R_o)	Susc.	Poor spores, exc. fol. high multigenic resistance
1536	B6043-WV6 (R_n)	Immune	No lb., good fol., sl. eb.

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
1537	B6086-WV21 (R_1, R_2, R_3)	Immune	No lb., good fol., no eb.
1538	B6653-WV7 (R_n)	Immune	No lb., some eb.
1539	B6655-WV1	Susc.	Good spores, mod.-low multigenic
1540	B6667-WV1	Susc.	Good to exc. spores, low multigenic res., Sebago type
1541	B6928-WV14	Susc.	Good spores. 20% defol., mod. multigenic resistance
1542	B6935-WV2 (R_n)	Immune	No lb., some eb.
1543	B6949-WV3	Susc.	Good spores, mod.-low multigenic resistance, Sebago type
1545	B6960-WV2	Immune	No lb., susc. eb.
1546	B6975-WV1	Susc.	Good spores, mod.-low multigenic resistance
1547	B6988-WV10	Susc.	Good spores, sl.-mod. multigenic resistance, similar to Kennebec
1549	B6994-WV2	Susc.	Good spores, low multigenic resistance
1550	B7019-WV1	Immune	No lb.
1551	B5141-6 (Lenape)	Susc.	Good spores, low multiple resistance
1553	NY59 (R_o)	Susc.	Good lesions spreading with good sporulation, mod. multigenic resistance
1554	M297	Susc.	Exc. sporulation
1555	$3R_c$-8 (R_2)	Immune	No lb.
1556	Green Mtn. (R_o)	Susc.	Good lesions and spores
1557	Norgold Russet	Susc.	Good spores
1585	1563_c-14 (R_4)	Susc.	Good spores
	Seed Stock Agriculture Canada		
1634	Green Mtn.	Susc.	Good spores and lesion dev.
1632	Libertas	Susc.	Good les. and spores
1645	F72090	Susc.	-
1642	F73008	Immune	No lb., good fol., sl. eb.
1641	F73092	Susc.	Good lb. and eb., good spores
1638	F73099	Susc.	Good spores
1640	F73104	Susc.	Exc. sporulation
1639	F74047	Susc.	Good spores
1643	F74117	Susc.	Exc. sporulation
1644	F74123	Immune	No lb., eb. susc.

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
1637	F75077	Susc.	Good les. dev. and spores
1631	F75114	Susc.	Good multiple resistance
1648	F76021	Susc.	-
1633	F76054	Susc.	Mod. multiple resistance
1635	F76076	Susc.	Mod. multiple resistance
1647	F77002	Immune	No lb., good fol.
	NE 107 Seed Stocks		
1689	Atlantic	Susc.	-
1577	Bake King	Susc.	Good spores
438	Batoche	Susc.	Good sporulation
421	Belchip	Susc.	Exc. sporulation
1695	Belleisle	Susc.	-
423	BelRus	Susc.	Good-exc. sporulation
418	Buckskin	Susc.	Good spores
444	Butte	Susc.	Good spores
1682	Campbell-11	Susc.	-
430	Campbell-12	Susc.	Good spores
1568	Campbell-13	Susc.	Good spores
454	Centennial Russet	Susc.	Good-to-exc. sporulation
432	Chippewa	Susc.	Good spores
1576	Croatan	Susc.	Good spores
434	Denali	Susc.	Good spores
1697	Green Mtn. (R_O)	Susc.	Exc. sporulation
420	Hudson	Susc.	Exc. sporulation
448	I. Cobbler (R_O)	Susc.	Exc. sporulation
414	Katahdin (R_O)	Susc.	Good spores
416	Kennebec (R_1)	Susc.	Good spores
447	Lemhi	Susc.	Good sporulation
415	Michibonne	Susc.	Good spores
1686	Michimac	Susc.	-
436	Norchip	Susc.	Good spores
433	Norland	Susc.	Good spores
1699	Peconic	Susc.	-
1687	Penn 71	Susc.	-
	Pungo	Susc.	-
428	Redeau	Susc.	Good sporulation
407	Rosa	Susc.	-
412	Russet Burbank	Susc.	Good sporulation
1583	Russette	Susc.	Good spores
446	Shepody	Susc.	Good sporulation
429	Superior	Susc.	Good sporulation
1581	Surchip	Susc.	Good sporulation
439	Tobique	Susc.	Good sporulation
442	Wauseon	Susc.	Good sporulation
1680	AF92-3	Susc.	Susc. to eb.
413	AF186-5	Susc.	Susc. to eb.
424	AF201-25	Susc.	Good spores

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
425	AF330-1	Susc.	-
1691	B6987-184 (Chipbelle)	Susc.	Good sporulation
402	B8086-3	Susc.	Good sporulation
1625	B8934-4	Susc.	Exc. sporulation
1627	B8972-1	Susc.	Exc. sporulation
457	BR5991-WV16	Immune	No lb. or eb.
441	BR7088-18	Immune	No lb., good fol., susc. eb.
1694	BR7093-23	Susc.	Good sporulation
449	C7232-4	Susc.	Good to exc. spores
1690	C74109-8	Immune	Susc. eb.
409	CA02-7	Susc.	Good spores
417	CD106-16	Immune	Eb. susc.
451	CF7353-1	Susc.	Good sporulation
401	CF7523-1	Susc.	Good sporulation
459	CF7615-4	Susc.	Good sporulation
460	CF7719-6	Immune	No lb., eb. susc.
467	CF7722-19	Susc.	Good spores
465	CF7829-4	Immune	No lb., good fol., eb. susc.
462	CF72107-15	Immune	No lb., good fol., sl. eb.
468	CF77127-3	Susc.	Exc. sporulation
1684	F67128	Susc.	Very susc. eb.
445	F68036	Susc.	Good sporulation
1685	F73008	Immune	Susc. eb.
458	F96026	Susc.	Good-exc. sporulation
422	G6880-1	Susc.	-
1688	G6666-4Y	Susc.	Good lesions and spores
450	MN8224	Susc.	Very susc., exc. sporulation
410	W718	Susc.	Good sporulation
	Maine and Campbell Soup Seedling Selections		
1586	AF236-1	Immune	No lb., eb. susc.
1588	AF307-5	Susc.	Good spores
1589	AF398-5	Susc.	Good spores
1565	BR5967-7	Susc.	Good spores
1572	BR6820-26	Susc.	Good spores
1566	BR7085-1	Immune	No lb., eb. susc.
1579	C7358-26A	Susc.	Good spores
1570	C7446-1	Susc.	Good spores
1571	C74109-8	Susc.	Good spores, eb. susc.
1575	CA02-7	Susc.	Good spores
1596	CA02-8	Susc.	Good spores, eb. susc.

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
1564	CD106-16	Immune	No lb., sl. eb.
1590	CF7518-4	Susc.	Good spores, eb. susc.
1559	CF7622-1	Immune	No lb., sl. eb.
1560	CF7622-10	Immune	No lb., sl. eb.
1561	CF7614-4	Immune	No lb., no eb.
1562	CF7620-2	Susc.	Good spores, eb. susc.
1994	CF7650-6	Susc.	Good spores, eb. susc.
	USDA Seedlings and New Releases		
1618	Chipbelle (B6987-184)	Susc.	Exc. sporulation
1619	Russette (B7583-6)	Susc.	Exc. sporulation
1621	B8686-8	Susc.	Good sporulation
1622	B8822-30	Susc.	Good sporulation
1624	B8848-2	Immune	No lb., susc. eb.
1625	B8934-4	Susc.	Exc. sporulation
1626	B8966-3	Immune	No lb., susc. eb.
1627	B8972-1	Susc.	Exc. sporulation
1628	B9916-6	Susc.	Good sporulation
	New Maine Seedling Selections		
1669	AF332-9	Susc.	Good spores
1667	AF332-11	Susc.	Good spores
1674	AF339-5	Susc.	Good spores, eb. susc.
1662	AF398-3	Immune	No lb., eb. susc.
1650	AF428-12	Susc.	Good spores
1671	AF431-4	Susc.	Good spores
1658	CF7523-1	Susc.	Good spores
1670	CF7615-4	Susc.	Sl.-mod. multiple
1659	CF7793-2	Immune	No lb., susc. eb.
1655	CF7727-3	Susc.	Good sporulation
1653	CF7739-14	Susc.	-
1675	CF7746-6	Susc.	Good spores
1665	CF7759-3	Susc.	Good to exc. sporulation
1661	CF7759-9	Susc.	Good spores
1649	WF530-2	Susc.	Good to exc. sporulation
	NY Andigena and Neotuberosum Material		
471	A140-4	Immune	No lb., eb. susc.
472	A140-6	Immune	No lb., eb. mod., fair fol.
473	A140-11	Immune	No lb., eb. susc.
474	A146-9	Immune	No lb., no eb. wild-type fol. small leaflets
475	A158-1	Immune	No lb., sl. eb. fertile wild-type fol.

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
476	A282-4	Immune	No lb., mod. eb., small leaflets
477	S377-41	Susc.	Good to exc. sporulation
470	NY63	Susc.	Good spores, sl.-mod. multigenic resistance
	Agriculture Canada Andigena Material (R. Tarn)		
516	A105	Immune	No lb., small pls.
517	A132	Immune	No lb.
518	A203	Immune	No lb., fair fol.
519	A276	Immune	No lb., fair fol.
520	A249	Immune	No lb., some eb.
521	A298	Immune	No lb., fertile, fair fol.
522	A421	Immune	No lb., pls. weak
523	A453	Immune	No lb., sl. eb., good fol.
524	A505	Immune	No lb., sl. eb., pls. fair
525	A541	Immune	No lb., sl. eb., fertile
	IR-1 Material		
494	Ackersegen	Susc.	Fair to good multigenic, sporulation mod.
493	Alpha	Susc.	Fair-good sporulation
515	Atzimba	Immune	No lb., sl. eb.
480	Bertita	Immune	No lb., eb. susc.
482	Dorita	Immune	No lb., eb. susc.
490	Elentita	Immune	No lb., sl. eb.
484	Greta	Immune	No lb., no eb.
483	Hindenburg	Immune	No lb., sl.-mod. eb.
485	Izstades	Immune	No lb., sl. eb., good fol.
486	Kenya Akiba	Immune	No lb., sl. eb.
495	Kufri Jeevan	Immune	No lb.
496	Kufri Joyti	Immune	No lb., mod. eb.
499	Libertas	Immune	No lb., some eb., good fol.
507	Limosa	Immune	No lb., susc. eb.
498	Losickij	Immune	No lb., some eb.
492	Maritta	Susc.	Mod. sporulation
488	Marries	Immune	No lb., eb. susc.
478	B5444-15 (R_1, R_2, R_3, R_4)	Immune	No lb.
505	B5444-34 (R_1, R_2, R_3, R_4)	Immune	No lb.
512	3618	Susc.	Good spores

West Virginia Table I. (Continued)

Field No.	Pedigree	Disease Reaction	Comments
504	203905	Immune	No lb., susc. eb.
481	215623 (R_n)	Immune	No lb., susc. eb.
498	USW930-1	Immune	No lb., no eb.
511	WV5-3 (R_1, R_3)	Immune	No lb., no eb.
513	WV11-32 (R_n)	Immune	No lb.
503	WV13-8 (R_1, R_4)	Susc.	Mod.-multigenic good sporulation
510	WV14-17	Immune	No lb., eb. susc.
500	Sto/Tuberosum (R2241)	Immune	No lb., some eb., good fol.
501	Dem/Tuberosum (R2245)	Immune	No lb., some eb.
502	Dem/Tuberosum (R2248)	Immune	No lb.
487	$3R_c$-8 (R_2)	Immune	No lb., no eb., good fol.
506	1563_c-14 (R_4)	Susc.	Fair-good sporulation

Comment Abbreviations - lb.= late blight; eb.= early blight; fol.= foliage; spores = sporulation; nod.= nodulate; exc.= excellent

WISCONSIN

L. E. Towill and R. E. Hanneman, Jr.

Genetics, Cytogenetics and Physiology of the Tuber-bearing Solanum Species

(Cooperative USDA, ARS and Wisconsin Experiment Station)

Genetics and Use of the Solanum commersonii Synaptic Variant. Efforts have been made to determine the genetics of a synaptic variant of Solanum commersonii P.I. 243503. The apparent absence of functional 'n' gametes on both the male and female side has prevented the conventional determination of its genetics at the diploid level. Consequently, a half-diallel has been done within this accession to determine the genetics of this variant at the diploid level. A scheme of 4x x 2x crosses has also been used providing tetraploid segregation ratios in the progeny.

The variant has been used as a female in several interspecific crosses and estimates of intraspecific male and female fertility have been made using 4x S. commersonii. Meiosis of interspecific hybrids of S. commersonii x S. chacoense appear to be quite normal by cytological observation and produce from ten to seventy-five percent stainable pollen.

Using 3x S. commersonii x S. chaocense plants as females, backcrosses to each of the parental species have been done; however, these crosses have produced some unexpected results. Backcrosses to S. chacoense were easier to accomplish and the progeny were in most cases considerably more vigorous than were the progeny in backcrosses to S. commersonii. The backcrosses to S. commersonii were unusually weak considering they are not inbred. Chromosome counts are currently being done on these plants.

The ease of backcrossing to 2EBN species is fortuitous for our goals of incorporating this variant into useful breeding stocks. Efforts are underway to incorporate "parallel spindles" into plants containing the meiotic variant to increase levels of 2n gamete production.

Incorporation of 1EBN Germplasm into More Readily Usable Forms. The incorporation of 1EBN germplasm into useful breeding material falls into two discrete categories: 1) transfers from Mexican diploids and S. commersonii into 2EBN material and 2) transfers from Series Etuberosa material into 2EBN material. The first category begins with the initial production of a triploid hybrid, followed by backcrosses to a 2x(2EBN) species. In this case however the 2x(1EBN) gamete may come from a colchicine produced 4x(2EBN) plant. Presumably meiotic pairing between any of the Mexican diploids and any 2EBN species will be sufficiently normal and that backcrossing will present no problem.

The second category presents more complex problems. A limited number of non-tuber-bearing x tuber-bearing crosses have been done, and although not all have been examined meiotically, apparently little or no meiotic pairing occurs between the Etuberosa and tuber-bearing genomes. Observations of male fertility have shown only a few percent stainable pollen, and this is probably

2n or near 2n. Allopolyploidy may be used as a means of crossing these hybrids with other 2EBN species; however, 2n gametes may be used as an alternative more rapid approach to incorporating Etuberosa genes into cultivated germplasm. Using this approach a cross of 3x brd_2 chc x 4x tub Wis AG 231 has yielded a putative pentaploid.

Assignment of Endosperm Balance Numbers (EBN) to Solanum species. Efforts are being made to define the Endosperm Balance Number (EBN) for all Solanum species in the IR-1 collection. To do this several accessions of each species are tested by crossing them with 1EBN, 2EBN and 4EBN standards. Seed set from all successful crosses is determined as is the ploidy level of the progeny. Pollen tube growth in the style is tested by fluorescent microscopy for all crosses which fail or result in poor seed set. This is done to eliminate other interspecific crossability barriers from interfering with the interpretation of EBN. The EBN for a species is assigned, then, based on seed set, ploidy of the progeny and stylar data.

Results from preliminary crossing last spring using several Mexican and U.S. species indicated that several more species in Series Longipedicellata are 2EBN. Successful crosses were achieved in 4x x 2x 2EBN crosses and the progeny from these crosses were all 3x. Therefore, in addition to S. stoloniferum, S. fendleri, S. hjertingii and S. polytrichon are 2EBN.

Large scale EBN screening among the species was begun this past summer and further testing will be done this spring and next summer. Preliminary evidence, though scant at this point, suggests that 2x S. michoacanum (S. trifidum) may be 1EBN. This species belongs to Series Pinnatisecta which contains the 1EBN species S. cardiophyllum and S. pinnatisectum. In addition other results imply that 4x S. acroscopicum, 2x S. berthaultii, 2x S. canasense ssp. xerophyllum, 2x S. marinasense and 2x S. sparsipilum are probably 2EBN. Many EBN's can be conferred from information in the literature; however, this study is an effort to confirm assignments using EBN standard species under defined conditions, with the elimination of other interspecific crossing barriers from clouding EBN interpretation. It is hoped that this information will eventually prove useful to those involved in potato improvement, interspecific gene transfer and the study of species relationships.

Protoplast Strategies for Somatic Cell Genetics. Methods of protoplast isolation, purification, and culture were examined for various tuber-bearing Solanum species. To date modifications of the procedure of Shepard (Plant Physiology 60: 313, 1977) have given adequate yields and survival in several species, haploids, and cultivars. All stock materials are maintained by in vitro plantlet culture and are propagated through nodal/tip cuttings. Lines containing metribuzin sensitivity, frost resistance, differential late blight resistance, and high regeneration capacity have been used. Regeneration procedures are being evaluated for these and other materials prior to beginning protoplast fusion studies. This is a joint project with Dr. J. P. Helgeson, Plant Physiologist, USDA, ARS, Madison.

Low Temperature Germplasm Preservation. The cryogenic exposure procedure developed for shoot tips of S. etuberosum gave survival for shoot tips of Solanum tuberosum Groups Andigena, Phureja, Stenotomum, and Tuberosum. Cryogenic experiments for all species often show considerable variation due, in part, to bacterial contamination which hinders the regrowth analysis after

treatment. Since this contamination probably arose from shoot-tips harvested from greenhouse-grown plants, a protocol was developed to use isolated shoot-tips from in vitro-grown (sterile) plantlets. Such plantlets were initially derived from meristem tip culture using techniques developed from our previous virus-elimination studies. Results from experiments using isolated shoot tips from sterile plantlets are much more consistent.

A second problem concerned the development of an adequate medium to test the regeneration potential of low temperature treated tips from S. tuberosum materials. Results from microscopic analyses of sections from treated buds of both S. etuberosum and S. tuberosum Group Tuberosum demonstrated that only a few cells within the tip survived the low temperatures (ca. -30° C, -40° C, -40° C transferred to liquid nitrogen). A suitable regrowth culture medium was developed such that treated tips of S. etuberosum developed into a multiple shoot mass. Although a medium for growth of control tips from cultivars was available, it did not suffice for treated materials--callus formation with occasional shoot regeneration was the usual response. Inclusion of the cytokinin, zeatin, gave multiple shoot production from both control and low temperature treated tips.

Thus, use of tips from sterile stock plantlets and development of new regeneration media has allowed more reproducible survival estimates along with significant shoot production from low temperature treated S. tuberosum Group Tuberosum cultivars. Some details differ in the cryogenic survival response as compared to the S. etuberosum model and are being examined, but the results are encouraging for cryogenic preservation of clonal germplasm.

Longevity of True Seed. The longevity of true seed for different species of the tuber-bearing Solanums under 1-2° C storage with a seed moisture content of about five percent was compiled from data collected by the Inter-Regional Potato Introduction Project (IR-1). Although long storage periods are not available for all species, accessions of many species retained high percentages of germination for at least 20 or more years. Examples include S. tuberosum Group Andigena, 98 percent after 27 years, Gp. Phureja, 96 percent after 23 years, Gp. Stenotomum 100 percent after 23 years; S. hjertingii 100 percent after 26 years, and S. demissum 92 percent after 28 years. Seed from some species exhibited an erratic pattern of germination from test to test over the period of storage.

Pollen Preservation by Cryogenic Methods. Previous data had suggested that the in vitro percentage of germination was roughly indicative of ability to set seed and that the rehydration of $CaCl_2$-dried pollen usually increased in vitro germination. In several tests, however, rehydration of dried pollen did not reproducibly increase seed set although the in vitro germination did increase. In several cases seed set with rehydrated pollen was considerably lower than that obtained by pollinating directly with dried pollen. Thus, in vitro percent germination gives an indication that stored pollen or low temperature-exposed pollen is viable but cannot directly be related to seed set. These data came from bulked pollen placed onto flowers borne on cut stems bulked from several plants within different accessions. Pollen from several species stored for one to two years in liquid nitrogen vapors did retain the ability to set seed.

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